

**CLARK COUNTY  
IMPACT REPORT**



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## **Executive Summary**

Clark County's opposition to the Yucca Mountain Project has been steadfast for nearly 20 years. Clark County, along with other Affected Units of Local Government (AULG), has spent more than a decade evaluating the potential impacts of the proposed high-level nuclear waste repository at Yucca Mountain in Nye County, Nevada.

Clark County has relied on appropriate procedural, legal, and technical bases in the operation of its Nuclear Waste Program. Since 1987, staff has provided program oversight for site characterization activities, including the review of and comment on various U.S. Department of Energy (DOE) documents; conducted and analyzed impact studies; and, conducted public outreach activities for the benefit of Clark County residents.

Clark County's Impact Assessment Report is also included as part of the State of Nevada's impact report. The report provides Clark County's analysis of the potential impacts resulting from the construction, operation and closure of the proposed repository.

The main purpose of the report is to fill the sizeable gap left in the DOE's analysis and assertions regarding impacts to Clark County. For the most part, the DOE has either underestimated or has completely mischaracterized the likely impacts resulting from the proposed repository. Admittedly, it has been difficult to characterize and assess the full range of impacts in the absence of a Final Environmental Impact Statement (FEIS) by the DOE and a final design for the repository. Further, the DOE has not updated much of the data used in its Draft Environmental Impact Statement (DEIS) (e.g. 1990 population data), which contributes to the inaccuracy of its assessment of the impacts.

It must be made clear that this report is not intended to be a request for impact assistance or to imply consent to the proposed repository. Rather, it is a comprehensive analysis of potential impacts anticipated by Clark County in the event that a positive site recommendation by the Secretary of Energy is accepted by the President of the United States and the United States Congress.

This report contains seven chapters and nine appendices. The report describes the context for Clark County's impact assessment by providing some general information about Clark County and it affirms ample basis for Clark County's opposition to the proposed repository. Three

chapters are devoted to articulating the extent of anticipated impacts. A key aspect of these impacts is that they occur immediately, beginning with the negative effect a site recommendation will have on Clark County's economy. For example, over the duration of shipment campaign, the cost to Clark County for additional personnel, planning, training, and public outreach resulting from the DOE's actions is estimated at over \$2.672 billion. Additional capital facilities and equipment costs to Clark County through 2010 have been estimated at \$280 million. These costs do not include any upgrades to the existing transportation system that may be needed. In addition, facilities and equipment will also need to be replaced at various points throughout the shipment campaign, although replacement costs have yet to be calculated.

In Chapter 3, the reader is able to quickly reference each of the following impacts covered in Chapters 4 and 5: gaming, property values, transportation, and impacts due to Yucca Mountain operations including environmental impacts, public safety, non-public safety, and Native American concerns.

As additional support for its position, Clark County has included in Chapter 6 a summary of public outreach efforts, including public opinion surveys, public information strategies, and other methods designed to inform Clark County residents about the County's position on the issue. It is important to note that the majority of public responses received indicate opposition to the Yucca Mountain Project. It is also important to note that the issues of highest significance and concern to the majority of residents correlate to those studied by Clark County for over fifteen years.

The public health and safety of Clark County residents are our primary concern, particularly in the area of transportation of nuclear waste. This report provides ample evidence that Clark County's constant opposition over nearly twenty years has not been misplaced.



## 1.0 Background

Clark County, with a land area of over 7,900 square miles, has been the fastest growing county in the United States for many years. Over 5,000 new residents per month have been arriving here to live, work, and play since the early 1990's, due to the surge in the casino industry beginning with the construction of The Mirage Resort Hotel in 1989. At the time of the decision to narrow the DOE's search for a suitable site to store high-level radioactive waste, Clark County's population was half what it is today, over 1.5 million. Over the next twenty years, the area's population is expected to reach 2.8 million.

Clark County is home to the "Las Vegas Strip" which, along with our world-famous downtown Las Vegas, allows the Southern Nevada area to enjoy a reputation as "The Entertainment Capital of the World." With more than 35 million visitors annually, the primary engine that drives our economic growth is the gaming industry. Also key to Clark County's economic growth are service- and construction-oriented businesses. According to the website for the City of Las Vegas, Lesa Coder, Director of the Office of Business Development for the City of Las Vegas, stated:

*"We're the premier business center in the Western United States, now and well into the twenty-first century. One major advantage is our location, which gives investors access to over 52 million people within a 1,000-mile radius..."*

While the focus here has historically been on gaming and tourism, in recent years the pro-business climate and diversity of lifestyle choices has produced a shift in public perception. Since the construction boom and influx of new residents in the early 1990's, the image of Southern Nevada has shifted from an entertainment mecca for only the rich and famous to one which strives for a sense of community and high quality of life for all residents. For example, a 1999 Federal Reserve Bank of St. Louis study ranked Las Vegas as "The Most Livable Big City in America." In that study, economist Howard J. Wall ranked 59 metropolitan areas of similar size based on strict criteria which reflects why people relocate to, and stay, in a particular community.

In a region where the concept of "perception is reality" is particularly marked, the stigma and perception of any danger associated with high level radioactive nuclear waste presents a very real and significant threat to Clark County residents, businesses, and visitors.

Clark County's opposition to the Yucca Mountain Project has been steadfast. Over the years, Clark County has been joined by other local governments, agencies and groups in opposition to the DOE'S efforts. (See Appendix A for resolutions in opposition to the proposed repository.)

## 2.0 Purpose and Basis

### Purpose

The purpose of this Impact Assessment Report is to set forth, from Clark County's perspective, the full range of potential impacts anticipated should the proposed high level radioactive waste repository at Yucca Mountain be approved and constructed. The proposed repository site is in Nye County, Nevada, just a few miles from the Clark County border. Clark County is the economic and population base for the State of Nevada. Therefore, it is important to articulate as complete a picture of the impacts as is possible, in light of the limited information and analysis provided by the DOE to date with respect to any such impacts.

The impacts identified as important to Clark County must be seriously considered by the Secretary of Energy, the President and Congress during the federal approval process, as required under the Nuclear Waste Policy Act as amended in 1987 (NWPAA) Section 114(a)(1)(D).

Clark County's large land area encompasses a unique mix of incorporated cities, urban and rural towns, and tribal entities. This Impact Assessment Report is intended to address the interests of not only unincorporated Clark County, but also, wherever possible and appropriate, the interests of the cities of Las Vegas, North Las Vegas, Henderson, Boulder City, and Mesquite, as well as the Las Vegas Band of Paiutes and the Moapa Band of Paiutes. Clark County has entered into interlocal agreements with these entities, affording the opportunity for significant impact assessment of critical areas. The results of those studies are reflected in this Impact Assessment Report.

### Basis

Since 1983 Clark County has been recognized as an active participant in monitoring the DOE Yucca Mountain nuclear waste program efforts. In 1988, DOE officially designated Clark County as an "Affected Unit of Local Government (AULG)" under provisions of the NWPAA, when the search for a geologic repository study site was reduced to only one alternative: *Yucca Mountain*. The AULG designation was an acknowledgement by the federal government that activities associated with the Yucca Mountain Project could result in considerable impacts to our residents and community. In fact, the provisions under the Act enable Clark County to determine "any potential economic, social, public health and safety, and environmental impacts of a repository," 42 U.S.C. Section 10135(c)(1)(B)(i).

In addition to the NWPAA, applicable case law supports Clark County's efforts to fully identify potential impacts. In *County of Esmeralda v. Department of Energy*, 925 F.2d 1216 (9<sup>th</sup> Cir. 1991), the court stated: "Affected unit status is also meant to ensure that all potential harms from repository operation – whatever the current estimate of their probability—are sufficiently studied before Yucca Mountain is approved as a repository." (emphasis added)

Further, under the National Environmental Policy Act (NEPA), the DOE is required to follow specific processes for identifying and assessing environmental impacts that may result from the operation of a nuclear waste repository at Yucca Mountain. Clark County officials have always maintained that absent the ability to review the DOE's FEIS, it is not certain whether the full range of impacts has been identified. What is certain is that the DOE's DEIS is woefully inadequate in the area of impact identification and assessment.

In addition to relying on applicable policies, regulations, and procedures, Clark County can support its position by looking to lessons learned from other jurisdictions facing similar challenges. Examples exist from the experiences of other communities as the U.S. Department of Energy attempts to address the problem of nuclear waste disposal. This is especially true in New Mexico where the Waste Isolation Pilot Plant (WIPP), a repository for transuranic waste, has begun operations. These lessons have to do with the way that DOE interacts with local governments with regard to plans, agreements and mandates. These lessons have been instrumental to Clark County in developing and/or modifying county policies and actions regarding Yucca Mountain as the program moves into the federal approval phase in 2001 and the licensing phase thereafter.

For these reasons, the Clark County Board of Commissioners created a framework for constant opposition to the Yucca Mountain Project by unanimously passing resolutions in opposition to the Yucca Mountain Project (Appendix B). This Impact Assessment Report, along with previously submitted comments to the DEIS, Supplemental DEIS (SDEIS), and Preliminary Site Suitability Evaluation (PSSE), provide the substance, detail, and justification for Clark County's long-established opposition. (See Clark County Comments to DEIS, SDEIS and PSSE, Appendix C.) In April 2001, the Board of County Commissioners adopted Strategic Priorities that further solidified its opposition to the Yucca Mountain Project.

In addition to submitting the above-mentioned procedural (response) documentation, Clark County has engaged in site characterization oversight, impact assessment, and public outreach

activities (within the parameters of the NWPAA and DOE appropriations requirements) in order to fully understand and compile a comprehensive, realistic analysis and report of the impacts.

Finally, it must be made very clear that Clark County is merely attempting to comprehensively articulate and to quantify potential impacts. This report should in no way be interpreted as a request for impact assistance, nor should it be construed as implied consent to the siting of the proposed repository at Yucca Mountain.

### **3.0 Overview of Impacts**

This overview chapter provides brief summaries of the impacts more fully described in Chapters 4 and 5 of this Impact Assessment Report. The summaries are intended to provide the reader with a reference point from which to quickly gather the key concerns and findings for each of these impact areas. Likewise Appendices A through I are intended to provide additional background, support and context for the impacts described in the report. The discussion of these impacts is based on the three transportation scenarios listed in Figure 1 (page 15). Scenarios 1 and 2 were derived directly from the Department of Energy's DEIS, and Scenario 3 was developed by a consultant for the State of Nevada and a Clark County transportation planner. These scenarios have been applied uniformly and consistently by both the State of Nevada and Clark County throughout our impact assessment studies for many years.

It should be noted that most of the impact analyses contained in this report are based upon the dates used in the DEIS regarding the anticipated time frame (2007) for shipping high level radioactive waste. Further, several of Clark County's impact studies were completed prior to the release of the SDEIS, where the DOE adjusted the time frame to 2010 for the proposed shipping campaign. Absent a final repository design and transportation plan, it is difficult to predict the start and duration of the shipping campaign. According to the recently released General Accounting Office report, shipment of high level radioactive waste would not begin before 2016. Clark County's impact studies have not been updated to reflect this timeframe estimate.

#### **Gaming Impacts**

Clark County has identified both the nature and the range of concerns of key tourism leaders as to the potential effects on the tourism industry of the DOE's proposal to ship high-level waste through Clark County to a repository at Yucca Mountain. Focused, confidential interviews were conducted with key tourism industry representatives. According to virtually every gaming industry representative interviewed, the most serious risk is from the stigma that will result if there is any accident of any kind involving the shipment of high level radioactive waste.

A survey of Clark County visitors in the weeks following the September 11, 2001 terrorism attacks indicates that even among those willing to travel, the possibility of a nuclear waste shipment campaign that proceeds even without incident will adversely affect their decision to visit

Las Vegas in the future. The survey also indicates that any type of nuclear waste shipment incident would significantly decrease the number of those willing to visit.

Based upon a recently released report conducted for the State of Nevada, even a small drop in visitation could result in gaming revenues falling by one-half billion dollars. In the event of a high-level waste shipping accident that resulted in a downturn of 10.0% - 15.0%, gaming revenue would drop by \$1.1 billion to \$1.7 billion. These losses could skyrocket to \$2.8 billion to \$3.7 billion in the event of a severe, prolonged downturn resulting from a serious high level radioactive waste accident.

### **Property Value Impacts**

Stable property values are a necessary component for the stability of Clark County's tax structure. Any threat to a government entity's ability to rely on property taxes as a stable source of income impacts not only that entity's ability to operate, but has a "domino" effect on all aspects of what people expect and deserve in terms of community livability.

This subchapter includes a comprehensive analysis from a practical and quantifiable point of view. Also included in the discussion is an extensive discussion on stigma and perception.

Depending on the transportation scenario applied, property value decreases directly resulting from transportation of nuclear waste through Clark County range from 2% to 30%, resulting in property value losses up to \$8.753 billion. Clark County took the initial property value analysis one step further by requesting a population-based economic analysis by University of Nevada, Las Vegas (UNLV). This analysis estimates potential economic impacts over the course of the DOE's shipping campaign (2010 to 2035) to be in the billions of dollars.

UNLV's Center for Business and Economic Research (CBER) analyzed additional economic impacts property value diminution will have on Clark County. The property value diminution report was prepared by Urban Environmental Research, LLC (UER). Job losses estimated in this analysis range from 11,294 – 90,718. Billions of dollars in revenue and income losses were also estimated in the CBER study.

### **Transportation Impacts**

The impacts addressed in this subchapter include impacts such as routine radiation exposure, accident costs, incident delay, transportation planning impacts, land use impacts, and monitoring impacts.

This subchapter also provides an interim assessment of the transportation system impacts attributable to the Yucca Mountain Project. Transportation system impacts are defined as changes

to the operation, condition, and performance of the County's transportation network. This subchapter addresses direct, indirect, and cumulative impacts of transporting waste through Clark County to Yucca Mountain.

In 1997, the Federal Highway Administration Cost Allocation Study developed a detailed model for calculating accident costs for combination trucks on urban highways. Combination trucks include all multiple axle tractor semi-trailer trucks, truck-trailers, trailer-semi trailer, and triple-trailer trucks as defined by the Federal Highway Administration (FHWA). The trucks proposed for use by DOE for the shipment of high level radioactive nuclear waste fall into the category of combination trucks.

When this model is adjusted to year 2000 dollars, and applied to the rail and heavy haul routes through Clark County, the forecasted accident costs range between \$70.7 million - \$170.4 million. Since on average, approximately 30% of these costs are not reimbursed to the affected party, Clark County can expect to absorb between \$21.2 million to \$51.1 million if an accident were to occur along one of these routes.

#### **Impacts Due to Yucca Mountain Operations**

This subchapter outlines Clark County's concerns related to the construction, operation and closure of the proposed repository. Absent a final repository design and the issuance of a FEIS, it is impossible to identify the full range of impacts.

However, given the long history of quality assurance problems in the Yucca Mountain program, it can be expected that a future inability to follow quality control procedures during the loading and sealing of casks with high level radioactive nuclear waste could result in the immediate loss of life, exposure to elevated levels of radiation, and premature failure of the disposal casks. Any of these events would result in a severe negative impact to Clark County. In addition, upwards of 1,800 Clark County residents are likely to work at Yucca Mountain under conditions that increase their risk of having negative health effects related to the handling of high level radioactive nuclear waste. Operations at Yucca Mountain could also jeopardize Clark County's compliance with the Endangered Species Act and its Federal Section 10A permit. Finally, as a non-attainment area under the Clean Air Act, Clark County's future economic growth may be restricted because of air pollution resulting from the Yucca Mountain Project.

#### **Public Safety Impacts**

This subchapter summarizes the integrated findings of an assessment conducted by UER of Southern Nevada's public safety agencies. This study covered incremental or additional costs to



governmental entities that would be directly attributable to the proposed repository. Combined costs under Scenario 3 would likely approach \$360 million. The majority of these costs is attributable to Clark County, with the largest portions designated for facilities, equipment, personnel, and training. Clark County's costs alone would be over \$274 million in unfounded government mandates.

#### **Non-Public Safety Impacts**

County departments and related agencies were studied to determine impacts that were not specifically related to public safety issues. In order to prepare for the commencement of shipments of high-level waste, Clark County non-public safety agencies identified approximately \$40 million in additional costs to Clark County departments and agencies. Over the 24-year shipping campaign described in the DEIS, the projected preparedness costs just for personnel, planning, training and public outreach are expected to reach over \$350 million. These costs represent an unfunded federal mandate to Clark County and the other affected entities addressed in this subchapter.

#### **Native American Concerns**

A separate chapter is devoted to Native American concerns. While many of the concerns of Native Americans are similar to others potentially affected by the Yucca Mountain Project, it is important to recognize that Native American concerns must be considered in ways that identify and reflect the range of impacts from a tribal perspective. Subchapters 4.2 and 4.5 also address specific potential impacts to the Moapa Band of Paiutes.

The Impact Assessment Report includes Chapter 6.0 that summarizes Public Involvement and Outreach, and Chapter 7.0 that offers a Summary and Recommendations. These chapters provide additional context for Clark County's position with respect to the proposed repository at Yucca Mountain.

**Figure 1 Summary of Scenarios**

Scenarios	Description
1*	No accident of any kind has occurred. However, anti-nuclear environmental groups and property owners along the route (who claim that their property values will decrease) have generated considerable publicity.
2*	Shipments of nuclear waste to the Yucca Mountain repository site have progressed for several years without incident. Three days after New Year's Day 2010, the driver of a truck transporting nuclear waste loses control of the vehicle and runs into the median of Interstate 15. The cask containing the nuclear waste breaks away from the trailer and skids 50 yards along the median of I-15 in North Las Vegas. The cask remains intact and no radiation is released, but the national media covers the event heavily.
3**	An accident involving a truck carrying spent nuclear fuel and a gasoline tanker on I-15 near the Las Vegas Strip. The accident triggers a chain reaction collision. Twenty-seven civilians, four sheriff's deputies, and seven firefighters are hospitalized after exposure to radiation at the site of accident. Another 1,000 or more persons are exposed to radiation from the fire's radioactive plume. Experts indicate that 5 to 200 latent cancer fatalities may result from the accident. The affected highway and several access ramps are closed for four days. The two drivers of the spent fuel hauler and the gasoline tanker, and one driver-escort, died from head injuries and burns. Six months later, the cleanup effort is still under way, and thousands of lawsuits have been filed. Preliminary reports estimate cleanup costs and economic losses in excess of \$1 billion.

\*Source: U.S. Department Of Energy, Office of Radioactive Waste Management (July 1999) Draft Environmental Impact Statement (DEIS) for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada.

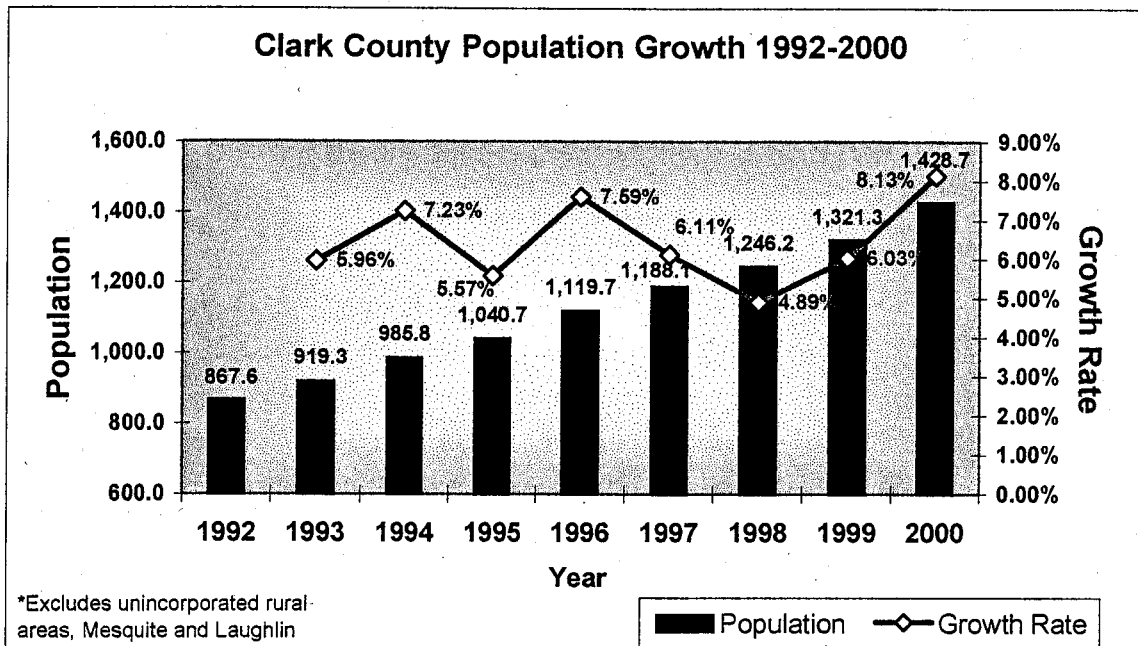
\*\*Source: Robert Halstead, Transportation Advisor, State of Nevada, Nuclear Waste Project Office, and Fred Dilger, Transportation Planner, Clark County, Nevada, Department of Comprehensive Planning, Nuclear Waste Division

## 4.0 Impact Analyses

### 4.1 Gaming and Tourism Impacts

Clark County has experienced burgeoning population growth over the last decade from a population of 867.6 thousand in 1992 to over 1.4 million in 2000 (Figure 2). Today, Clark County ranks as the fastest growing county of its size in the nation.

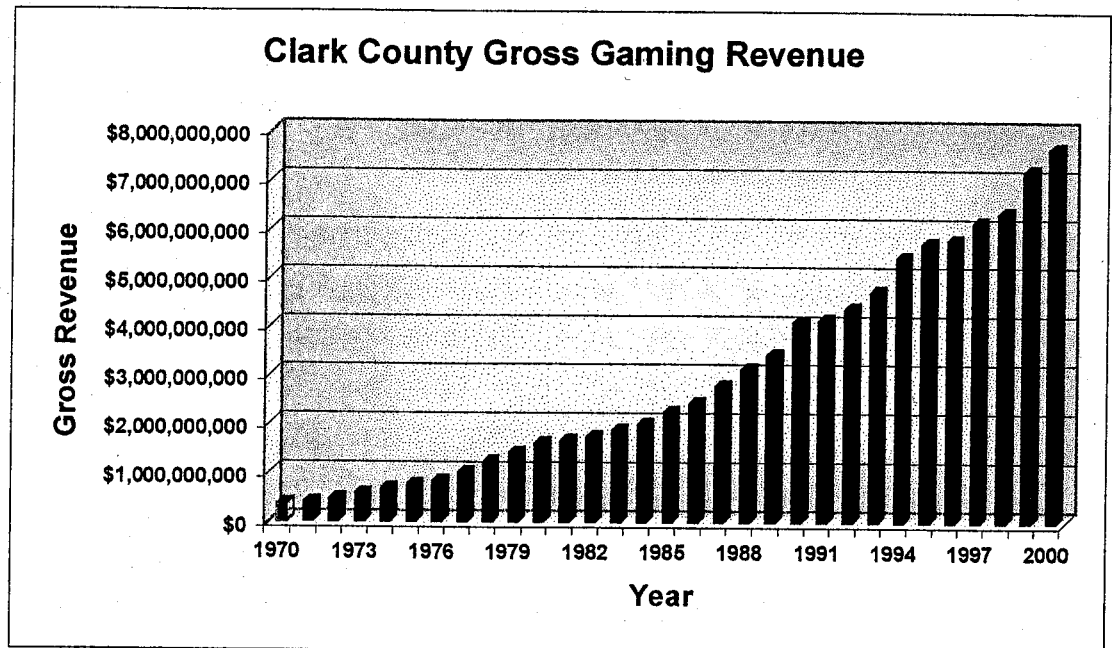
**Figure 2 Clark County Population Growth 1992 - 2000**



Source: Center for Business and Economic Research, UNLV, 2001

According to the Las Vegas Convention and Visitors Authority, the number of visitors coming to Las Vegas by auto and air exceeded 35.8 million in 2000. The percent of those visiting Las Vegas by air was 46%, while the percentage of those driving in was 54%. Air traffic into Las Vegas has grown at a compounded annual growth rate (CAGR) of 7.35%, while vehicle traffic grew at a 4.15% CAGR between 1970 and 2000. Over the last three decades, gaming revenues have increased from \$369 million to \$7.67 billion (Figure 3). The overall economic impact from these visitations now exceeds \$31.46 billion making it the primary engine of the area's economy.

Figure 3 Clark County Gross Gaming Revenue 1970-2000



Source: Center for Business and Economic Research, UNLV, 2001

In order to identify both the nature and the range of concerns of key tourism leaders as to the potential effects on the tourism industry of the DOE's proposal to ship high level radioactive waste through Clark County, focused, confidential interviews were conducted with gaming executives and a representative of one of their trade associations. The 14 gaming executives represented 10 casinos that generate 95.5% of the *Earnings Before Interest, Taxes, Depreciation, and Amortization* on the "Strip." The gaming executives interviewed included both the largest gaming corporations and representatives of the smaller operations. Gaming executives for the Las Vegas Strip, as well as the downtown casinos were interviewed.

Interviewees were asked what areas, if any, of the visitor economy might be vulnerable to the proposed high level radioactive nuclear waste shipments. Inquiries of respondents were made regarding their organizations and any specific concerns for their own businesses as a result of the DOE's proposal. They were also asked whether the "transportation of nuclear waste near areas of economic activities may create stigma effects resulting in people not wanting to visit such places or buy homes nearby." Gaming executives also were asked to rank the impact of the proposed high level radioactive nuclear waste shipment campaigns on tourism volume, their corporation's credit rating and appraised value.

Another series of questions were asked of the gaming industry executives about the types of activities that the industry and/or their individual organization had undertaken to plan and prepare for the DOE's proposed activities. Specifically, they were asked to discuss "what risk management tools or measures" they might deploy to offset any declines in visitation and to address whether they felt "that any downturn from stigma effects can be overcome by effective marketing." Gaming executives were asked whether they were aware of any coordinated planning activities for evacuating the "Las Vegas Strip" in case of an incident. Finally, responses were obtained to questions about their own organization's evacuation planning activities and whether their insurance covered nuclear related events.

Gaming executives emphasized two other key sub markets that contributed to the growth in revenues that their operations have experienced. Since 1990, the number of convention visitors has grown dramatically as has their economic contribution to Clark County. Since 1990, the number of conventioners has grown from 1.74 million to 3.86 million in 2000. The economic impact from this component of the market also has experienced phenomenal growth contributing \$4.4 billion to the Las Vegas valley's economy in 2000. One gaming executive from a larger destination resort stated that the convention trade is responsible for approximately one-third of its hotel room occupancy.

The current downturn in the U.S. economy was identified as a significant challenge that will likely contribute to slowing growth among this sector in the near term.

In particular, increasing energy costs were identified as a challenge in both minimizing operating expenses, as well as the potentially adverse effect it may have on visitor airline fares. One executive noted that energy costs for his operation had gone up \$10,000,000 this past year and that it was now costing about 1½ cents per share of their stock price.

In addition to energy costs, road congestion and air pollution were identified as significant issues that could endanger the longer-term economic health of the gaming industry. In fact, in a filing with the Securities and Exchange Commission, one of the largest companies stated that congestion along the I-15 corridor from California was a potential problem and that "capacity constraints of that highway or any other traffic disruptions may affect the number of customers who visit our facilities." Other challenges faced by these industry representatives include improving Clark County's education system and according to some, ensuring that in-migration continues so that there is a sufficient labor pool. One executive noted that despite all of the

population growth that Clark County had experienced, maintaining an adequate educated labor force remained a significant challenge in the face of a tight labor supply.

Overall, most of the executives believe that despite short-term cyclical responses to national and worldwide economic conditions, the overall trend for the gaming industry in the absence of high level radioactive nuclear waste shipments is positive.

Further, all of the gaming executives interviewed expressed concern that an accident, even a minor one along a route anywhere in Clark County, could have a devastating impact on their business. While some representatives were unsure of the scientific viability of the Yucca Mountain repository, all indicated that under no circumstance should trucks carrying high level radioactive nuclear waste come through Clark County. Several noted that just the transportation of high level radioactive nuclear waste coming from California through Clark County en route to Yucca Mountain, could significantly affect their business in an adverse manner. These industry representatives noted that congestion, particularly on weekends along the California/Nevada transportation corridor, has already proved problematic. They believe the addition of slow moving trucks containing such dangerous wastes will increase the likelihood and severity of an accident, discouraging some Californians from driving to Las Vegas. These representatives stated that Californians make up 30% of the visitors to Clark County. The increase in congestion along the California/Nevada corridor, combined with rising energy costs, is seen as a significant risk to gaming in Southern Nevada, especially for the Las Vegas downtown casinos.

According to virtually every gaming industry representative interviewed, the most serious risk is from the stigma that will result if there is any accident of any kind involving the shipment of high level radioactive nuclear waste. These representatives referenced the media coverage that is likely to accompany any incident involving a vehicle transporting high level radioactive nuclear waste. Several stated that an accident anywhere in Clark County would be reported worldwide and would be linked to Las Vegas because it is the nearest media outlet.

Many of the gaming executives discussed the various ways that stigma could affect their businesses. For example, earlier studies conducted for the State of Nevada indicated that convention planners would be less likely to hold a convention in Las Vegas if there were a nuclear transportation incident. Since 1990, the contribution of convention visitors to the local economy has grown exponentially. Several gaming representatives stated that given the growth in this sector, it is important to investigate what the fiscal implications could be to this subset of the market if the DOE proceeds with its program.

Another concern related to stigma that was frequently cited was the potential loss of attractiveness of Clark County as a place for families to live, especially if an incident were to occur. Some of the casino executives interviewed repeatedly mentioned that the tourism economy is driven by growth and that “population growth begets growth.” For these representatives, anything that makes Clark County a less attractive environment for in-migration will have some degree of adverse affect on their businesses. Some noted that this could result in fewer retirees moving into the area. Others felt that younger workers might leave resulting in an aging population that over time would require more services and would contribute fewer resources to the area economy eventually cascading into “urban decay.”

Some gaming industry executives were concerned of the possibility that investors might find Clark County a less attractive area for investment because of increased uncertainty related to the effects of the shipment campaign on the visitor economy. These gaming executives linked the high fixed costs associated with the gaming industry, as well as the need to continuously attract investment funds so that the new products can be developed to stimulate the market place. The potential negative impacts resulting from the high level radioactive nuclear waste shipment campaign might make the industry less attractive for investors.

Further, several gaming executives noted that their insurance would not cover the costs associated with a disruption of this type. Many also noted that while each casino has emergency response plans for their own facility(s) that a coordinated “Strip”-wide emergency response plan requiring in-place evacuation did not exist.

Finally, most of the representatives emphasized that the gaming industry is particularly sensitive to downturns in revenues because of the high level of fixed costs associated with this type of business. Thus, for every dollar of gross revenue that is reduced, the impact on the bottom line net income is even greater.

This unique sensitivity and vulnerability to high-profile events was made very clear after the September 11, 2001 terrorism attacks. The combined effects of economic downturn, airline and airport difficulties and the stigma and fear associated with travel safety are still being calculated. In the weeks after the attacks, the Las Vegas area gaming and tourism industries experienced unprecedented revenue and job losses. National media coverage of an in-depth investigation into possible terrorist planning activities in the Las Vegas area has served to heighten and prolong the negative effects of these events.

In order to understand how the Yucca Mountain Project might influence visitation subsequent to the September 11, 2001 terrorism attacks, a survey of 1,013 visitors was conducted in early December 2001, approximately twelve weeks after the attacks. These results reflect the opinions of the least risk adverse visitors to Clark County, that is those who were willing to visit at a time period when the effects of September 11, 2001 were still negatively impacting the area's economy. Among those surveyed, 25% indicated that just the shipment of high level radioactive nuclear waste through Clark County would affect their decision to visit Las Vegas in the future, even if there were no incidents of any type. Among the 25% who indicated that the shipments of high level radioactive nuclear waste would affect their decision to visit, 77% stated that they would reduce their visits and 12% stated that they would never visit Las Vegas again.

If a truck transporting high level radioactive nuclear waste was involved in an accident without a release of radiation, similar to the Scenario 2 event described on page 15, 37% of the visitors surveyed indicated that it would affect their decision to visit Las Vegas. Among these visitors, 49% stated that they would never visit Las Vegas again and 47% said that the frequency of their visits would decrease. If a serious accident resulting in a release of radiation were to occur, those surveyed indicated that the results would be devastating. Almost 80% noted that it would affect their decision and of those who stated that it would affect their decision, 62% stated that they would never visit Las Vegas again and 35% indicated that they would reduce the frequency of their visits.

As September 11, 2001 has already demonstrated, stigma can and has adversely affected Clark County's economy. While the full extent of this impact is still being measured, it is obvious that stigma related impacts have demonstrable adverse impacts on Clark County's sensitive tourism sector. The Las Vegas Sun reported on January 16, 2002, that according to the Las Vegas Convention and Visitors Authority, about 2.65 million people visited Las Vegas in November 2001, a decline of nearly 9% from November 2000. Passenger traffic at McCarran International Airport was down 18% to 2.55 million for the month, and reported vehicle traffic between Los Angeles and Las Vegas on I-15 declined 9% to 479,000. As a result, Las Vegas' average occupancy rate for the month was 76.4%, a 10% decline over November 2000.

This survey indicates that even among those who were willing to visit Las Vegas in the weeks following September 11, 2001, the shipment of high level radioactive nuclear waste will affect their willingness to continue to visit. These survey results highlight the vulnerability of



Clark County's economy to a stigma-related economic downturn as a result of the DOE's proposed shipments of high level radioactive nuclear waste.

The issue of stigma and perception with respect to Yucca Mountain, while minimized by the DOE, arguably poses the most significant threat to the economic well being of Clark County and its incorporated cities.

In a study prepared for the State of Nevada, a scenario-based study of analogous cases examined the potential impact to the gaming industry in Clark County of the of high level radioactive nuclear waste shipment campaign. This study indicates that if only 4.5% - 5.7% of current visitors decide to no longer visit Las Vegas because of these shipments, losses in gaming revenues would fall by more than one-half billion dollars. If 10.0% - 15.0% of the current volume of visitors decided to vacation elsewhere because of the shipment campaign, gaming revenue losses would likely grow to between \$1.1 billion to \$1.7 billion. Such losses might have been considered unprecedented prior to September 11, 2001. However, the terrorist attacks that occurred over two thousand miles away from Clark County resulted in dramatic drops in revenues for the gaming industry and in gaming tax revenues for state and local governments. If losses of this level were to be sustained for a prolonged period, the effects on the bottom line would be grave for a number of facilities. In the event of a severe, prolonged downturn such as could result from a high level radioactive nuclear waste shipment accident, the gaming revenue losses could reach \$2.8 billion to \$3.7 billion over one year.

## **4.2 Property Value Impacts**

Two key components of the local government tax structure in Nevada are sales taxes and property values. State and local governments rely heavily on these two sources of income. Obviously, steady increases in property value are desirable for property owners as well as government entities. Any threat to a government entity's ability to rely on property taxes as a stable source of income impacts not only that entity's ability to operate, but has a "domino" affect on all aspects of what people expect and deserve in terms of community livability.

Clark County's research has approached the issue of property values in a comprehensive fashion, analyzing it from a practical and quantifiable point of view, using expert advice and verifiable data through proven methodologies. Public opinion surveys have been conducted which corroborate the findings of technical experts in this area.

Another area that has been studied by both Clark County and the State of Nevada is the issue of stigma. As noted previously, the doctrine of “perception is reality” applies to Las Vegas like no other region in the world. Stigma resulting from an amplified perception of risk has been associated with all aspects of nuclear power plant siting and operations, and stigma has been associated with a decline in property values. Clark County investigated the likelihood and extent of property value diminution that may occur in Clark County, Nevada that is directly attributable to the Yucca Mountain Project. The findings, fully described in the report entitled *Clark County Property Value Report on the Effects of DOE’s Proposal to Ship High Level Radioactive Waste to a Repository at Yucca Mountain* (UER, June 2001) are indeed significant.

The research indicates that Clark County would likely experience a loss in fair market property value ranging from \$214.7 million to \$1.6 billion for three types of properties – residential, commercial, and industrial. Within this range, the projection depends on the route selected and whether the shipment campaign proceeds without incident, or whether an incident occurs but does not result in any release of radioactive material. Further, this projection is based only on the diminution of a limited number of land uses, and thus actual losses are likely to be much higher.

Stigma resulting from amplified perception of risk has been associated with all aspects of nuclear energy including property value diminution (Jenkins-Smith, 1999). Given the amplification of risk that has been associated with all things nuclear and the probability of an incident (even an incident with no release of radioactive material), there is a potential that Clark County may experience significant property value diminution over an extended period resulting from the DOE’s proposal to ship and store high level radioactive nuclear waste at Yucca Mountain.

If the proposed Yucca Mountain repository is constructed and primarily truck transport is used to move the waste, the majority of all of the waste will travel through Clark County. In this region of the country, no practical alternatives to I-15 and U.S. 93/95 are available for transit from Los Angeles, California, Salt Lake City, Utah, Phoenix, Arizona, or Reno, Nevada. Thus, while the DOE has not selected the transportation routes it will use, the DEIS for Yucca Mountain does identify these routes among the options under consideration. If the DOE’s proposed “mostly highway” scenario is selected, as described in the DEIS, almost 93,000 shipments will traverse through Clark County over 24 years. It must be noted that the exact number and duration of shipments is not known, as the FEIS and the final repository design have not yet been completed.

The property value diminution reported on in this subchapter is not based upon a formal appraisal of specific properties. Instead, it is based on the opinions, perceptions, and beliefs of Clark County residents, lenders, and appraisers as to the effects of the shipment campaign on property values along two routes under consideration.

Over the last 15 years, a number of public opinion surveys addressing the intensity of concerns and public perceptions of the risks of transporting of high level radioactive nuclear waste on nearby routes offer consistent results. These surveys have typically targeted areas or regions containing proposed nuclear waste transportation routes, and the objectives of the surveys were to discern residents' concerns and, in some cases, what their likely behavior might be if these routes were selected.

Property value is directly influenced by the attitudes and behaviors of market participants including real estate appraisers, lenders, and owners. Clark County appraisers and lenders were interviewed to assess their beliefs and perceptions about the extent of property value diminution that could occur under three different transportation scenarios for three different property types, and at distances varying from one mile to three miles along the proposed transportation routes.

Related literature indicates that a wide variety of environmental disamenities from high-voltage transmission lines, Superfund sites, hazardous waste landfills and incinerators can result in stigma-induced property value diminution (Colewell, 1990; McClelland et al., 1990; Greenberg and Hughes, 1991; Kiel and McClain, 1995; Smolen et al., 1992). In a 1978 study, Lindell et al. found that only 29% of the public would be willing to live within 10 miles of a nuclear waste facility and 32% percent stated that they were unwilling to live within 100 miles of a nuclear waste facility. Further, this study found that a nuclear waste repository was the least tolerable of eight industrial facility types including a nuclear power plant (Lindell et al., 1978). A 1997 national survey by Flynn, et al. indicated that 63.6% of the sample agreed or strongly agreed that property values along the transportation corridor for high level radioactive nuclear waste would decline. Similarly, 70% of the respondents to a survey in Santa Fe, New Mexico indicated that property values would fall along a proposed bypass that was proposed for the transportation of radioactive waste to the WIPP near Carlsbad, New Mexico (ZIA Research Associates, 1991). Sixty percent of those respondents also indicated that under *no conditions* would they purchase homes in proximity to the proposed bypass.

The literature also demonstrates that the courts recognize stigma-induced property value diminution as a viable claim. This court recognition is discussed in detail in *Clark County*

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*Property Value Report on the Effects of DOE's Proposal to Ship High Level Waste to a Repository at Yucca Mountain (UER, 2001).*

Formal protocols to measure stigma effects in property values have been developed by experts, such as appraisers. Lenders have developed formal policies for dealing with stigma. The acknowledgement of the effects of stigma on property values by the courts and other experts suggest that it is both reasonable and prudent to consider the potential effects of the proposed Yucca Mountain Project on Clark County's property values.

A survey of 512 Clark County residents was conducted by the Canon Center at UNLV in August 2000. The full findings of the survey are described in detail in the report, *Clark County Residents and Key Informant Surveys: Beliefs, Opinions, and Perceptions about Property Value Impacts from the Shipment of High-Level Nuclear Waste through Clark County, Nevada* (UER, 2001). The results were applied to the fair market valuation data for three groups of land uses within Clark County (residential, commercial, industrial).

The purpose of the survey mentioned above was to identify the attitudes, opinions, and perceptions of Clark County, Nevada residents regarding property values in Clark County, and to characterize their beliefs about the potential impacts of the proposed shipments on property values along the transportation corridor.

Several important findings resulted from this survey:

- Over one-half of the residents of Clark County consider the risk of an accident from the transportation of radioactive wastes to be serious or very serious.
- Clark County residents indicated that having a public school and a shopping center nearby has a positive impact on property values, by 61%, and 52.2%, respectively.
- Respondents stated that a polluting manufacturing plant, a landfill, and a highway or freeway used to ship nuclear waste would have the most negative affect on property values. The findings correlate with a similar survey of Santa Fe, New Mexico residents conducted in 1990.
- Approximately 80% of the respondents indicated that they were familiar with the proposed Yucca Mountain Project, while 75% said that they knew about the DOE's plans to ship high level radioactive nuclear waste through Clark County.
- Respondents were also asked whether a property's location near a high level radioactive waste transportation route would – increase a lot, increase somewhat, neither increase nor decrease, decrease somewhat, or decrease a lot – the likelihood of purchasing property.

- Altogether almost 82% of the respondents stated that a nearby high level radioactive nuclear waste route would either “decrease a lot” or “decrease somewhat” their likelihood of purchasing a residential property.
- Seventy-eight percent of the respondents utilized negative terms to describe the effects of the proposed high level radioactive nuclear waste shipment campaign through Clark County (Figure 4). Among the other terms used to describe the effects of the shipment campaign on property values were a “negative effect,” “pretty bad,” “upset people,” “people would move far away,” and “no one will buy houses.” In response to a similar closed-ended question, 71% of the Santa Fe, New Mexico residents surveyed indicated that property values would decline from the shipment of radioactive waste.

**Figure 4 Perception of Residential Property Value Impacts Located Near Specific Routes in Clark County, Nevada (NV) versus Santa Fe, New Mexico (NM)**

Response Category	Nevada	New Mexico*
	Percent (N)	Percent
Danger**	2.4% (12)	NA
Decrease in value	66.1% (327)	71.0%
No effect	12.7% (63)	16.0%
Do not know	3.4% (17)	5.0%
Pretty bad**	2.4% (12)	NA
Negative effect**	5.3% (26)	NA
Upset people**	1.8% (7)	NA
People move**	1.7% (8)	NA
Increase in value	0.6% (3)	5.0%
No one will buy houses**	0.6% (3)	NA
Other	3.0% (15)	3.0%
TOTAL	100% (495)	100% (489)

\* All percents are rounded to the nearest whole number and only the total number of respondents (N) was available for comparison.

\*\* NA - Categories not used in the Santa Fe, New Mexico survey

Both the Clark County and New Mexico surveys also questioned respondents about their views concerning potential nuclear waste transportation impacts on nearby commercial or business property (Figure 5). In this case, 40.7% of the Clark County respondents indicated that commercial property would decrease with another 5.8% indicating generally “negative effects” on properties. Interestingly, 6.2% responding to this open-ended question suggested adverse effects on business operations located near these routes. In contrast to the general question on property values, 33.9% of responses to the question on commercial properties indicated that there would be “no effect” on these values. The respondents to a similar closed-ended question in the Santa Fe,

New Mexico survey indicated that 37% of the respondents believed that commercial and business property values would decline along the shipment corridor to WIPP, while 38% stated that the shipment campaign would have “no effect.”

Clark County residents were asked under what conditions they would consider purchasing residential properties near high level radioactive nuclear waste transportation routes. Almost three-fourths of the respondents declared that they would not consider purchasing property along the transportation routes under *any conditions* (Figure 6). These responses are more negative than those expressed by respondents in the earlier Santa Fe, New Mexico study.

**Figure 5 Perceptions of Property Value Impacts on Commercial or Business Properties**

Response Category	Nevada Percent (N)	New Mexico Percent *
Decrease in value	40.7% (231)	37.0%
No effect	33.9% (192)	38.0%
Do not know	7.2% (41)	9.0%
Affect businesses**	6.2% (35)	NA
Negative effect**	5.8% (33)	NA
Increase in value	1.6% (9)	13.0%
Dangerous**	1.6% (9)	NA
Other	3.0% (17)	3.0%
TOTAL	100.0% (567)	100.0% (496)

\*All Santa Fe, New Mexico responses are rounded to the nearest whole number and only the total number of respondents (N) was available for comparison.

\*\* NA - Categories not included in the Santa Fe, New Mexico survey.

**Figure 6 Conditions Under Which Residents Would Consider Purchasing Residential Property near a Highway to be used for the Shipment of High-Level Radioactive Nuclear Waste in Clark County**

Environmental Condition	Nevada Percent (N)	New Mexico Percent *
Under no condition	74.9% (355)	59.0%
Do not know	2.5% (12)	8.0%
Depends on location**	3.2% (15)	NA
Would consider conditions	3.6% (17)	19.0%
Depends on safety measures**	3.2% (15)	NA
Other	6.1% (29)	5.0%
Would Not Affect Decision to Purchase***	NA	9.0%
TOTAL	100.0% (474)	100.0% (489)

\* All Santa Fe, New Mexico responses are rounded to the nearest whole number and only the total number of respondents (N) was available for comparison.

\*\* NA - Categories not included in the Santa Fe, New Mexico survey.

\*\*\* NA - Category not included in the Clark County, Nevada survey.

Clark County residents were asked whether residential property near a highway used for transporting high level radioactive waste would sell for more, the same, or less, than an identical property that *is not near* such a route (Figure 7). Eighty-two percent of the respondents believe such a property would sell for less; 15% think it would not make a difference; and only the remaining 3% believe it would sell for more. This pattern of response was similar to the earlier Santa Fe County, New Mexico study which found 71% of the respondents indicating that residential property would sell for less (ZIA Research Associates, 1991).

**Figure 7 Perceptions of Direction of Impact on Property Values**

Residential Property Near Nuclear Waste Shipment Routes would sell for...	Nevada	New Mexico
	Percentage (N)	Percentage (N)*
More money	3.3% (13)	3.0%
Same amount of money	14.5% (57)	20.0%
Less money	82.2% (324)	71.0%
Not Sure**	NA	6.0%
TOTAL	100.0% (394)	100.0% (501)

\* All Santa Fe, New Mexico responses are rounded to the nearest whole number and only the total number of respondents (N) was available.

\*\* NA - Categories not included in the Clark County, Nevada survey.

Respondents answering that a residential property would sell for more than or less than a comparable property not near a shipment route were then asked how much more or less they would expect the price to be. Of the 369 Clark County respondents who expect lower selling prices for homes near shipment routes, the mean expected drop in selling price in Clark County is estimated at approximately 25% compared to identical homes not near a highway that transports high-level radioactive nuclear waste (Figure 8).

**Figure 8 Percentage of Diminution in Selling Price of Residential Properties Near a High Level Radioactive Nuclear Waste Shipment Route Compared to an Identical Property Not Near Such a Route**

Diminution Amount	Nevada		New Mexico	
	Percent (N)	Cumulative Percent*	Percent (N)**	Cumulative Percent**
Less than 1 percent	12.4% (47)			
1-5 percent	6.1% (23)	18.5%		
6-10 percent	10.3% (39)	28.8%	11.0%***	11.0%***
11-20 percent	18.9% (72)	47.7%	22.0%	33.0%
21-30 percent	17.6% (67)	65.3%	19.0%	52.0%
31-40 percent	8.2% (31)	73.5%	13.0%	65.0%
41-50 percent	12.4% (47)	85.9%	10.0%	75.0%
51-60 percent	2.9% (11)	88.8%	5.0%	80.0%
61-75 percent	1.8% (7)	90.6%	2.0%	82.0%
More than 75 percent	6.6% (25)	97.2%	6.0%	88.0%
Not sure/refused	2.9% (11)	100.1%	12.0% (357)	100.0%

\* Percents are rounded to the nearest tenth

\*\* All percents are rounded to the nearest whole number and only the total number of respondents (N) is available for comparison.

\*\*\* The Santa Fe, New Mexico survey classification was Less Than Ten Percent.

When the 25% mean diminution rate reported by Clark County survey respondents is applied to all residential properties within one mile of the northern and western Beltway routes suggested in the DEIS, the resulting diminution in fair market value utilizing current assessed residential valuations is \$1.4 billion (Figure 9). Alternatively, if the Beltway is not expected to be completed before high level radioactive nuclear waste shipments commence, the application of the 25% mean property value diminution along the I-15 transportation corridor in Clark County could result in a loss of \$1.7 billion of fair market residential valuation.

**Figure 9 Application of Property Value Survey to Clark County Residential Fair Market Value**

		Nevada Transportation Corridor	
		Beltway	I-15
Clark County Property Value Survey	Rate		
Residential at One Mile	25.00%	\$1,406,531,814	\$1,727,460,214

It is important to note that these ranges represent the application of the mean rate of property value diminution to current residential fair market valuation within one mile of the beltway and I-15 routes through Clark County as reported by those Clark County residents who were surveyed. These rates are based on the respondent's current perception of likely property



value diminution and are based on extrapolating current residential assessed valuation data to fair market value. Obviously, perceptions are dynamic and thus are likely to change over time. In addition, the current assessed residential valuation within Clark County does not account for the significant developments that are proposed over the next decade especially along the northern beltway. Thus, these figures are best understood as representing the intensity of public concern about the effect of DOE's proposal to construct the proposed Yucca Mountain repository and ship high level radioactive nuclear waste through Clark County.

The results of focused interviews with Clark County lenders and appraisers are described in detail in the report, *Clark County Residents and Key Informant Surveys: Beliefs, Opinions, and Perceptions about Property Value Impacts from the Shipment of High-level Nuclear Waste through Clark County, Nevada*. The results are applied to the assessed valuation data for three groups of land uses within Clark County. UER conducted a survey of 18 Clark County lenders and 35 certified appraisers in May 2000.

Under the first scenario, the appraisers and lenders were asked to evaluate whether there would be any changes in property values along the corridor if "no event" occurred, but there was adverse publicity, particularly, at the onset of the shipment campaign. This scenario was assigned to three discreet residential, commercial, and industrial properties that were characterized in terms of size, location, lease fees, and other factors. As noted above, the lenders and appraisers were also asked to differentiate the level of impact, if any, that might be experienced at two varying distances along the corridor (within 1 mile of the shipment route and within 1 to 3 miles of shipment routes).

According to the lenders and appraisers, residential properties would lose the most value in percentage terms. Appraisers indicated that within one mile of a shipment route, residential properties would decline on the average by 3.50%, while lenders indicated the decline would be approximately 2.00% (Figure 10). When these rates of diminution are applied to residential fair market valuation data for these property types within one mile of the beltway route, the potential property value loss for residential property ranges from \$112.5 million to \$196.9 million (Figure 10). In contrast, if these rates are applied to fair market property value data within one mile of the I-15 route then diminution could range from \$138.2 million to \$241.8 million (Figure 11).

According to the appraisers and lenders, residential properties at a distance of one to three miles from the routes would continue to experience the greatest decline in value relative to the other two property types. When the rates of property value diminution are applied to residential

fair market value data at a distance of one to three miles from the Beltway route, the diminution ranges from \$91 million to \$265.6 million. From the I-15 route, the diminution ranges from \$105.4 million to \$307.7 million. Thus, under Scenario 1, lenders and appraisers indicated that the rate of residential property value diminution when applied to fair market value data along the beltway might be as high as \$203.5 million to \$462.5 million, while along the I-15 route the diminution could range from \$243.6 million to \$549.5 million.

**Figure 10 Scenario 1 Mean Property Value Diminutions within 1 Mile and at 1 to 3 Miles of the Beltway Route**

Residential Property Value Diminution					
	1 mile		1 - 3 miles		Totals
Lenders (N*)	2.00% (11)	\$112,522,546	0.50% (11)	\$90,954,074	\$203,476,617
Appraisers (N*)	3.50% (13)	\$196,914,454	1.46% (12)	\$265,585,894	\$462,500,346
Commercial Property Value Diminution					
	1 mile		1 - 3 miles		Totals
Lenders (N*)	0.56% (10)	\$447,457	0.56% (10)	\$5,167,840	\$5,615,300
Appraisers (N*)	3.21% (14)	\$2,564,894	1.25% (14)	\$11,535,360	\$14,100,251
Industrial Property Value Diminution					
	1 mile		1 - 3 miles		Totals
Lenders (N*)	0.56% (10)	\$993,494	0.56% (10)	\$4,925,689	\$5,919,186
Appraisers (N*)	1.25% (12)	\$2,217,623	0.83% (12)	\$7,300,577	\$9,518,200

\* All percents are rounded to the nearest whole number and only the total number of respondents (N) is available for comparison.

Figures 12 and 13 summarize the results of the property value loss under each of the scenarios as estimated by the Clark County bankers and lenders. What these figures suggest is that among those most experienced with estimating Clark County property values, there is a perception that significant adverse impacts will occur along either of the Clark County routes proposed, for all property types examined, even under the most benign scenario.

**Figure 11 Scenario 1 Mean Property Value Diminution within 1 Mile and at 1 to 3 Miles of the I-15 Route**

	Residential Property Value Diminution				
	1 mile		1 - 3 miles		Totals
Lenders (N*)	2.00% (11)	\$138,196,817	0.50% (11)	\$105,370,546	\$243,567,363
Appraisers (N*)	3.50% (13)	\$241,844,431	1.46% (12)	\$307,681,997	\$549,526,426
	Commercial Property Value Diminution				
	1 mile		1 - 3 miles		Totals
Lenders (N*)	0.56% (10)	\$5,478,700	0.56% (10)	\$8,625,117	\$14,103,817
Appraisers (N*)	3.21% (14)	\$12,229,240	1.25% (14)	\$12,783,654	\$24,498,609
	Industrial Property Value Diminution				
	1 mile		1 - 3 miles		Totals
Lenders (N*)	0.56% (10)	\$7,082,897	0.56% (10)	\$14,305,271	\$21,388,171
Appraisers (N*)	1.25% (12)	\$40,600,186	0.83% (12)	\$31,931,411	\$72,531,594

\* All percents are rounded to the nearest whole number and only the total number of respondents (N) is available for comparison.

**Figure 12 Property Value Diminutions under Three Scenarios within 3-Mile Distance of the Proposed Beltway Route**

	Residential		Commercial		Industrial	
Groups	Lenders	Appraisers	Lenders	Appraisers	Lenders	Appraisers
Scenario 1	\$203,219,474	\$462,500,346	\$5,615,300	\$14,100,251	\$5,919,186	\$9,518,200
Scenario 2	\$646,024,023	\$1,175,472,314	\$12,424,417	\$33,873,129	\$15,892,269	\$27,680,400
Scenario 3	\$5,269,739,823	\$6,203,196,049	\$171,414,257	\$189,179,886	\$125,658,343	\$192,465,463

**Figure 13 Property Value Diminutions under Three Scenarios within 3-Miles of the I-15 Shipment Route, by Professional Group (Lenders and Appraisers)**

	Residential		Commercial		Industrial	
Groups	Lenders	Appraisers	Lenders	Appraisers	Lenders	Appraisers
Scenario 1	\$243,567,363	\$549,526,426	\$21,388,171	\$72,531,494	\$14,103,817	\$25,012,894
Scenario 2	\$772,643,577	\$1,392,987,706	\$76,137,260	\$171,126,151	\$54,535,563	\$83,790,291
Scenario 3	\$6,218,675,720	\$7,318,862,089	\$704,094,009	\$926,894,417	\$361,917,017	\$507,543,183

The findings also indicate that increasing the severity of events within the scenarios, as illustrated in Scenario 2 and 3, results in significantly larger rates of impact. Under Scenario 3, the most serious accident event evaluated, residential property diminution rises to \$5.3 billion - \$6.2 billion within 3 miles of the Beltway route and \$6.2 billion - \$7.3 billion within 3 miles of the I-15 route.

The City of Las Vegas is the largest incorporated city within Clark County. Thus, it is reasonable to expect that the largest potential dollar decrease in property values would be experienced in this jurisdiction (Figure 14). According to the lenders and appraisers, residential properties within the City of Las Vegas, like all other jurisdictions within Clark County, are likely to experience the largest loss in property values along both the I-15 route and the Beltway.

**Figure 14 Total Property Value Diminutions by Route, Property Type, Scenario, and Professional Group (Lenders and Appraisers) for Las Vegas**

	Beltway Route		I-15 Route	
Residential	Lenders	Appraisers	Lenders	Appraisers
Scenario 1	\$90,541,066	\$205,191,963	\$156,784,337	\$340,430,714
Scenario 2	\$287,362,977	\$520,964,800	\$495,190,989	\$850,970,611
Scenario 3	\$2,331,648,849	\$2,744,464,529	\$3,713,101,297	\$4,365,535,780
Commercial				
Scenario 1	\$3,037,806	\$6,972,709	\$13,237,277	\$49,171,100
Scenario 2	\$6,004,080	\$16,916,829	\$53,674,129	\$115,411,900
Scenario 3	\$90,950,803	\$112,319,546	\$447,409,589	\$598,515,980
Industrial				
Scenario 1	\$51,203	\$75,889	\$2,117,549	\$3,789,223
Scenario 2	\$91,431	\$190,177	\$8,429,277	\$12,838,477
Scenario 3	\$914,320	\$1,529,657	\$55,243,149	\$76,911,223

Lenders and appraisers repeatedly remarked that the future economic growth of the area is inextricably linked to the development of the Northern and Western Beltway, i.e., the Beltway route. Thus, while property value impacts may be lower today along the Beltway, it is expected to play a major role in the Valley's future development (see *City of Las Vegas Governmental Fiscal Impact Report*, UER, 2001). If the DOE selects the Beltway as its preferred route, as it has suggested in the DEIS, then the future economic growth of Las Vegas and in fact the entire Valley may be diminished.

In North Las Vegas, the largest property value impacts are estimated for residential properties along the I-15 route (Figure 15). For these properties, the loss in fair market value could reach \$521.6 million - \$614.8 million. In contrast, residential property value losses along the Beltway could reach \$305.8 million - \$361.6 million. However, like Las Vegas, North Las Vegas expects its primary future economic growth to occur along the Beltway route.

**Figure 15 Total Property Value Diminutions by Route, Property Type, Scenario, and Professional Group (Lenders and Appraisers) for North Las Vegas**

	Beltway Route		I-15 Route	
Residential	Lenders	Appraisers	Lenders	Appraisers
Scenario 1	\$7,859,509	\$22,557,620	\$18,084,091	\$43,549,057
Scenario 2	\$2,572,649	\$61,528,697	\$57,812,634	\$112,868,383
Scenario 3	\$305,833,589	\$361,564,006	\$521,619,643	\$614,827,454
Commercial				
Scenario 1	\$56,694	\$126,551	\$883,334	\$3,295,426
Scenario 2	\$101,243	\$307,774	\$3,603,451	\$7,733,040
Scenario 3	\$1,687,703	\$2,075,460	\$29,894,617	\$40,021,897
Industrial				
Scenario 1	\$701,063	\$1,039,077	\$3,837,409	\$7,016,377
Scenario 2	\$1,251,900	\$2,603,951	\$16,343,883	\$24,408,994
Scenario 3	\$12,518,997	\$20,944,283	\$104,117,777	\$142,515,549

Residential properties in unincorporated Clark County vary from the pattern in Las Vegas and Clark County as a whole. In unincorporated Clark County the larger property value losses are found along the Beltway, when one applies the results of the lenders and appraisers survey to fair market residential valuation (Figure 16). Along the Beltway route, the losses could range from \$96.7 million - \$218 million under Scenario 1 and \$306.8 million - \$552.6 million under Scenario 2. Along this same route, the losses rise to \$2.47 billion to \$3 billion, under Scenario 3. In contrast, along I-15, they range from \$60.4 - \$149 million under Scenario 1; \$193.7 million - \$389.3 million under Scenario 2; and \$1.8 billion - \$2.1 billion under Scenario 3.

**Figure 16 Total Property Value Diminutions by Route, Property Type, Scenario, and Professional Group (Lenders and Appraisers) for Unincorporated Clark County**

	Beltway Route		I-15 Route	
Residential	Lenders	Appraisers	Lenders	Appraisers
Scenario 1	\$96,721,051	\$218,055,049	\$60,411,103	\$149,047,049
Scenario 2	\$306,791,731	\$552,598,249	\$193,706,420	\$389,305,446
Scenario 3	\$2,465,897,000	\$3,004,957,211	\$1,820,280,886	\$2,146,608,183
Commercial				
Scenario 1	\$2,255,291	\$5,943,709	\$7,002,051	\$19,007,780
Scenario 2	\$3,429,466	\$14,261,703	\$17,674,380	\$45,508,674
Scenario 3	\$69,608,637	\$87,840,826	\$217,622,694	\$275,939,337
Industrial				
Scenario 1	\$4,725,197	\$7,687,794	\$7,707,137	\$13,491,854
Scenario 2	\$13,326,246	\$22,781,314	\$28,539,711	\$44,437,863
Scenario 3	\$102,710,006	\$155,520,860	\$193,041,071	\$273,645,749

In Henderson, the primary property value impacts are likely to be felt by industrial properties along the I-15 (Figure 17). These properties could see a drop in fair market value of \$279,414 to \$414,000 under Scenario 1 and these losses would grow from half a million to 1 million under Scenario 2. In the event of a Scenario 3 accident, these losses could reach \$5 million to \$8.4 million.

**Figure 17 Total Property Value Diminutions by Route, Property Scenario, and Professional Group (Lenders and Appraisers) for Henderson**

	I-15 Route	
Residential	Lenders	Appraisers
Scenario 1	\$108,483	\$297,531
Scenario 2	\$352,697	\$801,763
Scenario 3	\$3,920,037	\$4,631,311
Industrial		
Scenario 1	\$279,731	\$414,603
Scenario 2	\$499,520	\$1,039,003
Scenario 3	\$4,995,209	\$8,356,983

Since all of Mesquite lies within three miles of the I-15 corridor, the community would experience significant impacts under all of the scenarios. The most significant impacts are estimated for residential properties (Figure 18). These properties can anticipate losses in fair market value of between \$8.2 million - \$16.4 million under Scenario 1. If an accident without a release, such as described in Scenario 2 were to occur, the loss to residential property values could grow to \$25.8 million - \$40 million.

**Figure 18 Total Property Value Diminutions by Route, Property Type, Scenario, and Professional Group (Lenders and Appraisers) for Mesquite**

	I-15 Route	
Residential	Lenders	Appraisers
Scenario 1	\$8,246,511	\$16,398,186
Scenario 2	\$25,801,111	\$39,578,803
Scenario 3	\$162,440,351	\$190,436,134
Commercial		
Scenario 1	\$265,509	\$1,057,289
Scenario 2	\$1,185,300	\$2,472,537
Scenario 3	\$9,167,111	\$12,417,203
Industrial		
Scenario 1	\$161,991	\$300,840
Scenario 2	\$723,171	\$1,065,951
Scenario 3	\$3,693,951	\$6,113,680

The literature clearly indicates that knowledge of an undesirable environmental condition is closely associated with declines in property values. Surveys of Clark County residents show that 77% of Clark County residents are familiar with the DOE's plans. This finding is consistent with earlier surveys conducted for over a decade. The media attention that is sure to accompany any final decision to construct the repository and the transport of high level radioactive nuclear waste will certainly maintain, if not increase, public awareness of this issue.

Perception, especially the perception of risk, also has been positively correlated with property value diminution. When Clark County residents were asked about their perception of what will happen to residential property values if the DOE proceeds with its plans, over 80% indicated the effects in negative terms and almost two-thirds described the impacts on commercial properties in similar negative terms. Moreover, two expert groups, Clark County lenders and appraisers (with an average of over a decade of experience in Clark County determining property values), also overwhelmingly indicated that property values are likely to suffer as a result of the DOE's proposed actions.

In fact, even under the most benign scenario where no incident of any type occurs, the Clark County lenders and appraisers projected that residential property values would decline by 2.00% - 3.50%, resulting in losses of \$243.6 million to \$549.5 million along the I-15 route and \$203.3 million - \$462.5 million along the Beltway route. These experts indicate that if an event

were to occur, even with no release of radioactive material, the rate of residential property value diminution would increase to 6% to 8% within one mile and 1.64% - 4.00% within one to three miles. This also is consistent with actual experience that has demonstrated that distance is associated with the rate of diminution with the largest drops occurring closest to the undesirable environmental condition.

When one considers the findings from the lenders and appraisers for the most severe accident event studies, Scenario 3, the level of diminution indicated is substantially higher than for the other two scenarios. Under this scenario, lenders and appraisers indicate that residential property losses would likely reach approximately 30%. This is consistent with findings in the literature that show that the increasing magnitude of an event influences the degree of property value diminution.

The Clark County residents surveyed indicated on average that they expect a 25% drop in residential property values. This rate of diminution is consistent with an earlier survey of residents in Santa Fe, New Mexico along the transportation corridor for waste shipments to WIPP. This rate of diminution is substantially higher than what has been demonstrated around landfills, and is remarkably close to the level of diminution indicated as likely by the experts under Scenario 3.

The DEIS assumes that there will be no event of any kind during the shipment period. This would be consistent with the level of losses indicated by the experts under Scenario 1. Thus, Scenario 1 appears to be an appropriate lower boundary for the level of impact that may be experienced. Using Scenario 1 as the lower boundary means that at a minimum, property value diminution is likely to range from \$214.8 million to \$647 million.

Clark County is ranked as the fastest growing county in the nation. This growth has led to increasing congestion along the transportation routes being considered. This in turn increases the likelihood of an incident. While the probability of Scenario 3 may be small, if it were to occur the consequences of such an event would be devastating.

It is important to note that these estimates of potential property value damage are based on "fair market value." From the private property owner's perspective, these projected rates of diminution imply that there will likely be a loss of personal wealth and either increased property tax rates and/or reduced governmental services, even if the shipment of high level radioactive waste occurs without an incident of any type. If an incident occurs and there is a release of radioactive material, the diminution could be devastating.



As this study has shown, the extent of property value diminution varies by land use and route. This has important implications. If the I-15 route were selected, the total impact would likely be highest using the current value of developed land. This is because the area is almost fully developed; however, in unincorporated Clark County there is already a greater impact on residential properties along the Beltway. The Beltway has also been identified as critical to future economic growth within the Las Vegas Valley. The DOE's selection of a route for shipping high level radioactive waste has very significant consequences that vary by land use and jurisdiction.

In conclusion, the Yucca Mountain transportation campaign, even under the DOE's own scenario that postulates no *incidents of any type*, will likely result in significant property value losses within Clark County.

This research supports Clark County's findings that property values are likely to be affected adversely by the DOE's proposed actions. It is impossible to estimate the exact property value reductions as a result of the DOE's proposals for Yucca Mountain absent a FEIS, description of transportation routes throughout the valley, and final repository design. However, there is no doubt that the Yucca Mountain program poses a significant threat to property values in Clark County.

#### **Economic Losses Based Upon Property Values and Population Estimates**

As noted previously in this report, the consulting firm of UER interviewed experienced lenders and appraisers within Clark County regarding the effects three transportation scenarios would have on local property values.

UNLV's CBER was requested to utilize these results as input into the Regional Economic Model, Inc. (REMI) and compare these outputs to the normal REMI outputs (Appendix D). CBER was specifically tasked with:

- a. Estimating employment, income and expenditure impacts of property value losses under three alternative scenarios; and
- b. Estimating lost property taxes.

Within each scenario are both minimum and maximum impacts that can be expected to occur within the community. There are, therefore, six options. However, only two options will be discussed. These options are Scenario 1 (minimum impact) and Scenario 3 (maximum impact). This will allow the reader to gain a sense of economic impacts and provides a potential bounding of economic impacts on Clark County.

Two benchmarks that can be utilized when comparing this study are:

- During the Great Depression one in three persons were unemployed.
- The terrorist attacks of September 11, 2001, resulted in layoffs of over 11,000 Clark County residents.

The REMI model utilizes 1992 dollars. Therefore, all dollars reflected in this section are in 1992 constant dollars. This results in estimates that are extremely conservative.

#### **Impacts Based Upon Scenario 1**

The impacts identified as minimum impacts within Scenario 1 (trucks utilizing the Clark County transportation system without incident) are as follows:

- a. Employment would be reduced by 5,393 jobs.
- b. Gross Regional Product (Spending) would be reduced by \$185 million. This is a one-year figure and will be cumulative over the life of the project to \$5.6 billion.
- c. Real Disposable Income would be reduced by \$136 million for one year. Cumulatively, over the life of the project, losses of Real Disposable Income could exceed \$4.7 billion.
- d. Population would be reduced by 11,294 people. This is an average population loss over the life of the project. Of interest to note is that over this last decade, the population within Clark County has never declined and in fact has grown, on average, 6.27% per year.

#### **Impacts Based Upon Scenario 3**

The impacts identified as maximum impacts within Scenario 3 (a serious accident including the release of radioactive materials involving the Clark County transportation system) are as follows:

- a. Employment would be reduced by 54,429 jobs. It should be noted that this is equivalent to increasing the current unemployment rate by approximately 6.5% (roughly 10 times the impact under Scenario 1) to more than 13%.
- b. Gross Regional Product (Spending) would be reduced by \$1.4 billion. This is a one-year figure and will be cumulative over the life of the project to \$68.1 billion. This is the equivalent expenditures made by over 30 major hotel properties.
- c. Real Disposable Income would be reduced by \$686 million for one year. Cumulatively, over the life of the project, this figure rises to \$42.1 billion.
- d. Population would be reduced by 90,718 people, more than 8 times the loss under Scenario 1. This is an average population loss over the life of the project.

These estimates under Scenario 3 reflect an expected magnitude of impact. However, it is difficult to verify the duration and likelihood of this impact based upon the information provided

by the DOE to date. Unlike most accidents that cause brief disruptions to our every day lives, a nuclear release will result in a much more prolonged disruption than other hazardous incidents or events. Figure 19 below summarizes the minimum and maximum expected economic losses based on the REMI model.

**Figure 19 Economic Impacts Based Upon Property Values and Population Estimates from Years 2010 through 2035**

Economic Losses	Scenario 1	Scenario 3
	Minimum Impact	Maximum Impact
Population	11,294	90,718
Job	5,393	54,429
Gross Regional Product		
Annual	\$182 million*	\$1.4 billion*
Cumulative***	\$5.6 billion**	\$68.1 billion**
Disposable Personal Income		
Annual	\$136 million*	\$686 million*
Cumulative***	\$4.7 billion**	\$42.1 billion**

\* Projected for 2010 in constant 1992 dollars.

\*\* All dollars are in constant 1992 dollars due to the REMI model. Therefore, all dollars represented are conservative estimates.

\*\*\* For period from 2010 through 2035; dollars are in constant 1992 dollars.

### 4.3 Transportation Impacts

#### Introduction

This subchapter provides an interim assessment of six of the fourteen transportation route (rail and truck) alternatives that DOE identified in its DEIS. The DEIS, although seriously deficient in its transportation analysis, provided the first indication of how the DOE proposes to move the waste to Yucca Mountain for disposal. The information contained in the DEIS serves as the basis for the following assessment of transportation impacts to Clark County.

The DEIS identified 14 "implementing alternatives" for possible use in transporting high level radioactive waste and spent nuclear fuel from generating sites to the proposed repository at Yucca Mountain, Nevada. These implementing alternatives are potential rail, heavy-haul, or legal-weight truck routes that may be used to transport high level radioactive nuclear waste and spent nuclear fuel. Of these 14 transportation route alternatives, 6 travel through Clark County, Nevada. The impacts addressed in this subchapter include impacts such as routine radiation exposure, accident costs, incident delay, transportation planning impacts, land use impacts, and monitoring impacts.

Although the DEIS provided a cursory examination of 14 “implementing alternatives,” it did not identify a best alternative. Consequently, it is difficult to prepare a definitive assessment of the transportation impacts attributable to the Yucca Mountain Project since the DOE failed to provide specific information about its program. The DEIS itself acknowledges this failure when it indicates that additional studies must be completed before transportation system impacts can be assessed.

These impacts, defined as changes to the operation, condition, and performance of the Yucca Mountain Project that adversely affect the transportation network in Clark County, Nevada, are organized to coincide with the Yucca Mountain Project completion phases.

The proposed repository would be completed in three phases: construction, operation, and post-closure. Although this chapter does not examine post-closure transportation system impacts, it does address the cumulative impacts attributable to the additional burden of the DOE’s low-level radioactive waste disposal operations at the Nevada Test Site (NTS).

Further, this report does not address the mitigation of the impacts described herein, and should not be used as a “baseline” for impact mitigation. The DOE should use this estimate as a guide for identifying and addressing future issues related to transportation. Future studies will be necessary to identify specific routes and impact assessment should Yucca Mountain be selected as the nation’s repository for high level radioactive nuclear waste.

The transportation system impacts fit within the Council on Environmental Quality’s (CEQ) interpretation of NEPA as indirect and cumulative. In NEPA, certain standards for evaluating impacts and determining their significance have evolved. These standards were applied here in order to determine probable and significant impacts. Within these limits, Clark County estimated which impacts were reasonably foreseeable based on their probability and significance. Impacts that were not reasonably foreseeable were not considered. Two types of NEPA-defined impacts were examined in this report: indirect and cumulative.

### **Indirect Impacts**

Transportation of high level radioactive nuclear waste to Yucca Mountain is an indirect effect of the Yucca Mountain Project under NEPA because (1) the effects are a consequence of the proposed action (i.e., construction of the proposed Yucca Mountain high level radioactive nuclear waste disposal facility), and (2) the effects of this transportation are removed in time and location from the proposed repository, itself. The impacts assessed in this report were found to meet the

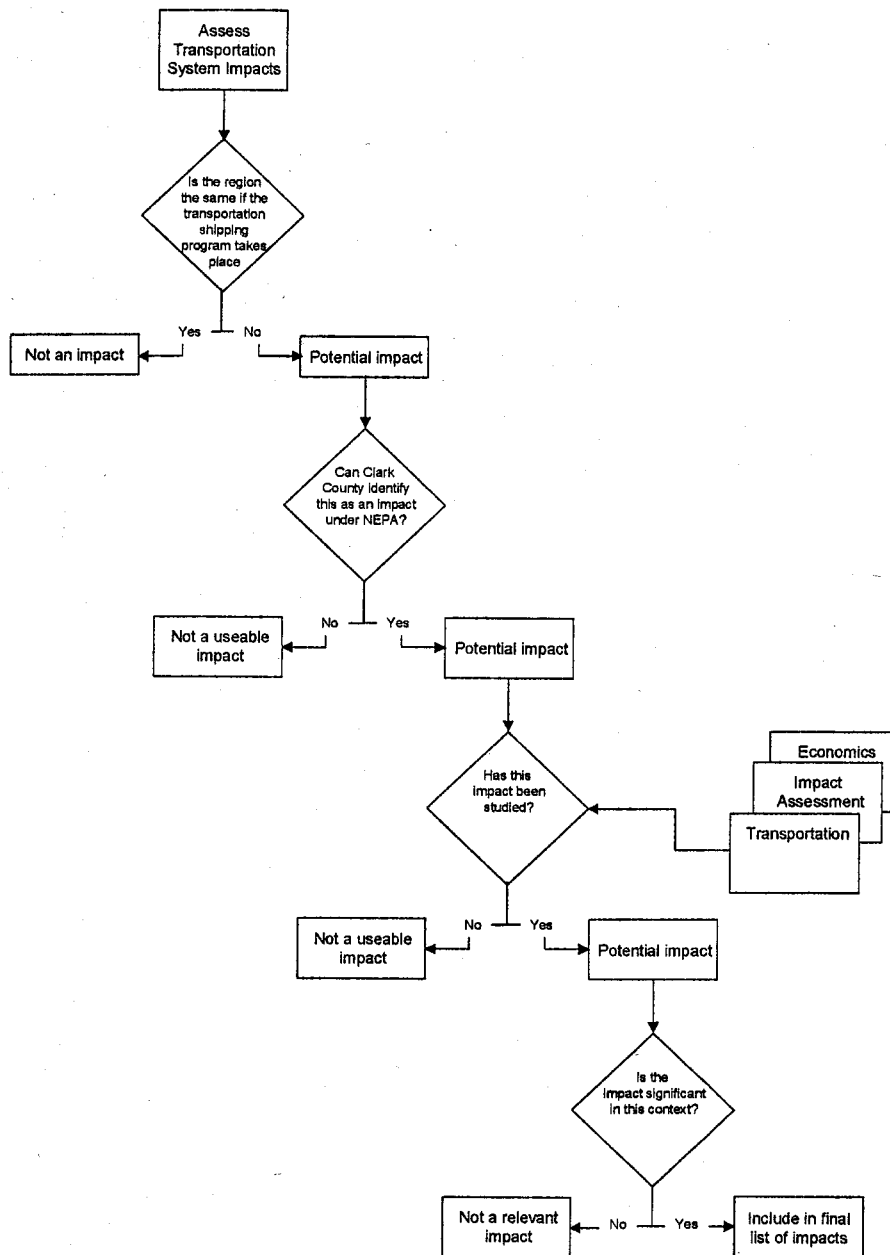
three-step test established for indirect effects in *Sierra Club v. Marsh*, 808 F. Supp. 852, 875 (D. Mass., 1984).

This test is:

1. *Can one say with confidence that the impacts are likely to occur?*
2. *Can one describe them now with sufficient specificity to make their consideration useful?*
3. *Will the decision maker be able to take account of the impacts now, before the agency is so firmly committed to the project that further environmental knowledge, as a practical matter, will prove irrelevant to the government's decision?*

The impacts were identified through literature review, professional judgment, and consultation with other agencies, and chosen based on the logic model presented on page 43:

Figure 20 Logic Model Used to Define Indirect Impacts



The impacts described in this subchapter also satisfy the other requirements of being both probable and significant should the Yucca Mountain Project proceed.

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### **Cumulative Impacts**

The cumulative impacts examined in this subchapter are based on the DOE's use of the NTS as a disposal site for the ongoing program to clean up nuclear weapons production facilities through the United States. The CEQ defines cumulative impact as "... the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions. ...". The use of the NTS as a low level radioactive waste disposal site fits this definition. Most of the low level radioactive waste from these sites will be shipped to the NTS for permanent disposal. For the foreseeable future, the most likely mode of transport for these wastes is by legal-weight truck on the highway system. However, the use of heavy-haul trucks or rail has not been excluded from consideration by the DOE.

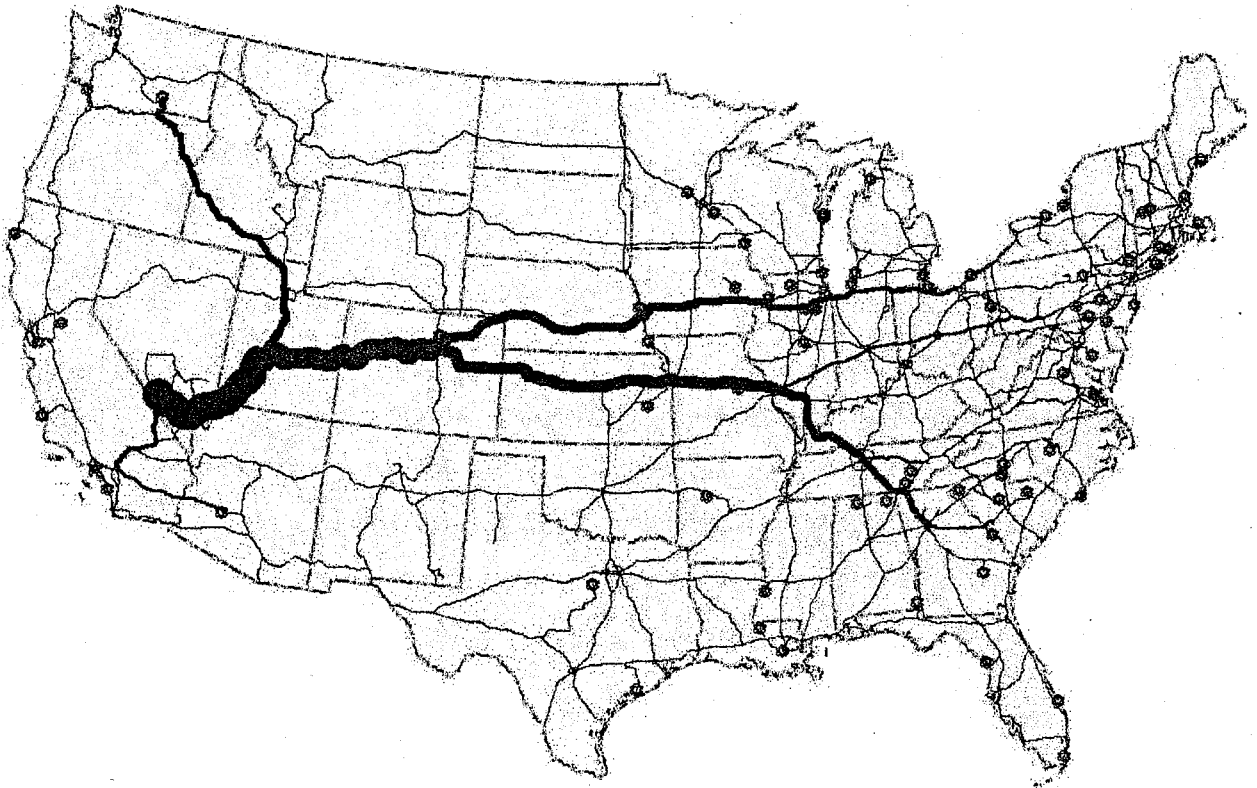
### **Definition of the Region of Influence**

Clark County is within the region of influence of the Yucca Mountain Project for transportation because Congress identified the interstate highway system as the default route for the transportation of high level radioactive nuclear waste. The most direct route from power generating sites to Yucca Mountain is the interstate highway system through Clark County. Therefore most of the transportation routes from shipping sites would likely pass through Clark County.<sup>1</sup>

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<sup>1</sup> The State of Nevada does have the ability to designate a preferred route if an analysis done in accordance with the provisions contained in *Guidelines for Selecting Preferred Highway Routes for Highway Route Controlled Quantity Shipments of Radioactive Materials* (August 1992), which demonstrates that the alternate route has no negative effect on public health and safety. Whether or not Nevada will choose to perform such an analysis, or whether or not that analysis will show positive effects on health and safety is not clear. Therefore, it is reasonable to assume that the default route will be used.

**Figure 21 Cross-Country High Level Radioactive Nuclear Waste Shipments on the Interstate Highway System**



The shortest routes from the waste generating sites to Yucca Mountain pass through Clark County en route to Yucca Mountain. Congress anticipated efforts to avoid transportation of waste through particular areas. In all likelihood, that is why Congress designated, in the NWPA, the interstate highway system as the default transportation route for the movement of high level radioactive nuclear waste to a repository. If the proposed repository is approved, Clark County would likely request that the shipment be rerouted to avoid populated areas of the county. Other similarly affected entities would also be likely to request that the shipments be rerouted. The likely result of changing the route will be an uneconomical routing process that is both circuitous and expensive.

Because the majority of the truck-transported high level radioactive waste would pass through Clark County en route to Yucca Mountain, the transportation impacts would be concentrated in Clark County. The Nuclear Regulatory Commission identified Clark County as



part of the maximally affected region in the nation in an Environmental Impact Statement

(NUREG 1437) because it sought to identify the maximum impact scenario. Following are the areas of impact most significant to the residents and visitors of Clark County.

### **Routine Radiation**

In order to examine the effects of the routine transportation of high level radioactive nuclear waste, the State of Nevada hired M. H. Chew & Associates to examine the health effects of a routine rail shipment of high level radioactive nuclear waste to Yucca Mountain. A portion of the Chew report is excerpted below. The entire report is included as Appendix F.

The Union Pacific Railroad will routinely make extended stops for train assembly, safety inspections, etc. Some of the stops are quite extended. Since the stop doses of radiation will be considerably larger than the passing doses, the latter were not examined. Three locations that are affected by the stopped doses are considered in the impact analysis. Two of the locations are hotel/casinos and the third is the Clark County Government Center.

According to the DEIS, DOE's rail routing analysis for Jean, Nevada indicates that about 87% of all rail shipments to Yucca Mountain would use the Union Pacific mainline through downtown Las Vegas. According to the DOE'S SDEIS, There would be 17,364 rail cask shipments through Las Vegas over 38 years, an average of 457 cask shipments per year.

The DEIS assumes that spent nuclear fuel rail casks will be shipped in general freight service. However, for purposes of evaluating a maximum credible incident-free scenario, this analysis assumes each rail cask is shipped through Las Vegas separately by general freight service in a different train. Thus, there would be 457 rail cask shipments per year through Las Vegas for 38 years. There are a number of locations along the Union Pacific railroad through Las Vegas where entire trains and groups of freight cars are routinely stopped for varying periods of time. For this analysis the state of Nevada selected three such locations.

Stops for carrier interchange or train assembly could require from 2 to 24 hours. Stops for crew changes, car changes, engine refueling, train maintenance, regulatory inspections, and traffic control, could range from 15 minutes to more than 2 hours. In planning for receipt of casks shipped by general freight service, the DOE has indicated its intention to take advantage of U.S. Department of Transportation regulations that allow stoppage of rail cars in transit for periods of up to 48 hours.

A major portion of the analysis finds significant annual doses at the designated locations.

The figure below summarizes the findings for the cumulative annual doses (457 hours) at each of three locations.

The M. H. Chew report concludes that the shipment of high level radioactive nuclear waste will impose measurable doses of radiation on people living or employed with one-half mile of any proposed route. These doses are summarized in Figure 22:

**Figure 22 Routine Radiation Doses**

Building/Maximally Exposed Individual	Distance (meters)	457 hour Dose (mrem)
Casino 1, MEI 1	40	27.6
Casino 1, MEI 2	15	200
Casino 2, MEI 1	35	36.2
Casino 2, MEI 2	160	1.05
Clark County Government Center	20	114
Clark County Government Center	30	49.5
Clark County Government Center	100	3.43

#### **Accident Costs**

Vehicular traffic accident costs include deaths, injuries, pain, disabilities, lost productivity, grief, material damage, and crash prevention expenses. Previous studies that evaluate the relationship between financial expenses and safety make it possible to assign a value to marginal changes in traffic risk. The National Highway Traffic Safety Administration estimates traffic accident costs at .065 dollars per mile. This estimate excludes pain and lost quality of life. The Federal Highway Cost Allocation Study performed in 1997 made a more detailed estimate of external costs for combination trucks on urban highways. The external costs are costs not borne by the carrier. By definition then, they are costs imposed on the local community. This analysis uses the more detailed FHWA estimate.

#### **Construction Phase Accident Costs**

The construction phase accident costs are calculated for the percentage of the routes that will traverse Clark County. The volumes of shipments are taken from the DEIS and are included for each route. The FHWA estimate of costs for combination trucks on urban highways (adjusted to year 2000 dollars) is \$1.24 per vehicle mile. These costs are summarized in Figure 23.

**Figure 23 Construction Phase Accident Costs**

Alternative	DEIS listed length of the rail corridor	Length of the rail corridor in Clark County	Percent of the Corridor in Clark County	Total Shipping Miles for Construction Projects	Total Shipping Miles in Clark County	Forecasted accident costs
Jean Rail Corridor	112	88	0.79	38,524,940	30,269,596	\$102,912,425
Valley Modified Rail Corridor	98	90	0.92	19,262,470	17,690,023	\$70,655,344
Apex Dry Lake Heavy Haul Route	114	91	0.80	19,883,840	15,872,188	\$134,270,347
Caliente Heavy-Haul Route	234	66	0.71	37,903,570	26,888,857	\$170,443,822
Sloan-Jean Heavy-Haul Route	117	66	0.56	19,883,840	11,216,525	\$97,891,418

Approximately 30% of these costs would likely not be reimbursed to the affected parties. Using the 30% figure, the amount of unreimbursed accident costs is estimated below.

**Operation Phase Accident Costs**

The operation phase accident costs are calculated for the heavy-haul and legal weight truck routes that traverse Clark County. Figure 24 below contains unreimbursed accident costs to Clark during the period Yucca Mountain repository would be operational.

**Figure 24 Operation Phase Unreimbursed Accident Costs**

Operation	Shipments through Clark County	Shipment Miles in Clark County	Accident Costs	Unreimbursed Accident Costs
Apex Dry Lake	10,815	1121948.1	\$1,391,216	\$417,365
Caliente Heavy-Haul Route	10,815	1670268.6	\$2,071,133	\$621,340
Sloan-Jean Heavy-Haul Route	10,815	835134.3	\$1,035,567	\$310,670
Legal-weight truck	49,523	4902777	\$6,079,443	\$1,823,833

Total unreimbursed accident costs due to the construction and operation of the Yucca Mountain repository are summarized in Figure 25 below.

**Figure 25 Unreimbursed Accident Costs in Clark County**

Jean Rail Corridor	\$30,873,728
Valley Modified Rail Corridor	\$21,196,603
Apex Dry Lake Heavy Haul Route	\$40,281,104
Caliente Heavy-Haul Route	\$51,133,147
Sloan-Jean Heavy-Haul Route	\$29,367,425

### **Cumulative Impact Accident Costs**

The cumulative impact of the DOE's shipments to the NTS is also significant. The volumes of shipments are from the DEIS and are included for each route. The FHWA estimate of costs for combination trucks on urban highways (adjusted to year 2000 dollars) is \$1.24 per vehicle mile. The numbers presented in Figure 26 represent the unreimbursed costs to Clark County due to low level waste disposal activities at the NTS.

**Figure 26 Cumulative Unreimbursed Accident Costs**

	Accident Costs	Unreimbursed Accident Costs
Cumulative Impact	\$32,899,680	\$9,869,904

### **Incident Delay**

Incident delay is the change to traffic system performance due to traffic incidents. This subsection includes delays due to drivers stuck in traffic as well as "gaper-lock" - the tendency for drivers in opposing lanes to slow down to observe the scene of an incident. Two types of incidents are considered: Traffic accidents, and incidents in which radiation contamination is released beyond the vehicle. Clark County's analysis assumes that when radiation is released and is confined to the vehicle, it will be detected at a routine stop instead of "in transit." Clark County's analysis differentiates between two types of delay. The first is incident delay in which the delay associated with specific incidents or a specific type of incident can be assessed. The second type of delay, system delay, is the impact a major incident will have on the function of a regional transportation system. Delay impacts occur when drivers are stuck in traffic immediately behind an incident waiting for it to clear. This section measures the traffic delay costs due to design incidents. The purpose is to establish an upper boundary on the impacts due to delay.

### Construction Phase Incident Delay

During the construction phase of the Yucca Mountain Project, various rail and/or heavy-haul routes will be constructed. Accidents that occur during this construction will cause traffic delays. The upper bound of the expenses are calculated for each of the various implementing alternatives the DOE proposes to construct through Clark County. The DEIS anticipates the need for up to 1,800 new jobs.

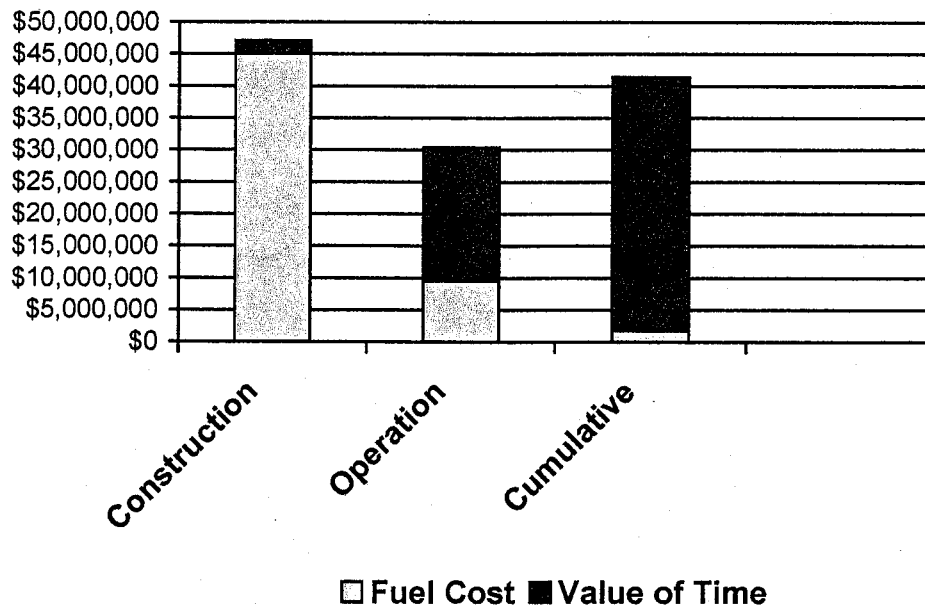
### Summary of Incident Delay Impacts

The upper boundary of the delay costs to the residents of Clark County due to traffic delays caused by the Yucca Mountain Project and the disposal of low level waste at the NTS are shown below:

#### Travel time variability

When travelers are diverted from routes due to accidents and incidents, it reduces the reliability of that route system. For example, travelers to time sensitive events such as meetings or airplane flights may choose a more circuitous route that has a reliable travel time over a more direct or faster route that is less reliable.

**Figure 27 Incident Delay Costs to Clark County Residents**



### **Transportation Planning Impacts**

The absence of a coherent plan to transport the high level radioactive nuclear waste is a significant impact that is already affecting Clark County. Without definitive knowledge of the DOE's transportation plan, Clark County decision-makers cannot engage in planning practices that will minimize harm in the event of an incident. It is difficult to anticipate, for example, appropriate land uses along possible routes. It is also difficult to plan in advance for emergency evacuation routes and strategic locations for emergency services. This plan should be prepared in accordance with the Statewide Planning/Metropolitan Planning regulation issued by FHWA on Oct 28, 1993. These statutes require a continuing, comprehensive, and coordinated transportation planning process for the metropolitan areas and states. The plan should recognize - as does the Nuclear Regulatory Commission - that Clark County is within the Area of Influence of Yucca Mountain and that its transportation network must be considered in this report.

The plan ultimately produced by the DOE must describe how the following items will affect Clark County's transportation system and how the DOE will provide the following:

- Evacuation Planning Zone Maps
- Logistical Support for shipping operations
- Recovery Operations
- Institutional Commitments
- Incident Management System
- Incident Command system
- Truck and rail (identify) routes by volume, mode, waste type, time of day and date
- Impacts (assessment) caused by the unique configuration of the rail classification yards northeast of Las Vegas to facilitate rail movement
- Hazards (mitigation) along the routes
- Equitable dispersion of radiological risks nationally

Serious land use and transportation planning considerations exist within potential routes. For instance, the following land uses within one-half mile of high level radioactive waste routes would be affected by daily anticipated truck trips along Clark County's highways:

- 37 schools
- 2 major health facilities
- 1 special event center

- 23 hotels

It should be noted that the population sectors such as children and seniors would be most directly affected. As noted in Chapter 4, Section 4.5, public safety and preparedness for potential accidents are primary concerns.

### **Construction Phase Land Use Impacts**

The construction of various routes through Clark County will impose a burden on Clark County's public facilities. The workers and their families will require public services and Clark County will have to pay for these services. Standard impact fee assessment methods were used to determine the following impacts for various categories of public facilities (Figure 28).

**Figure 28 Summary of Public Facility Costs**

Alternative Public Facility	Jean Rail Corridor	Valley Siding Rail	Apex-Dry Lake Heavy Haul	Caliente Heavy-Haul	Apex Heavy Haul
Parks	\$806,380	\$368,130	\$613,550	\$911,560	\$262,950
Fire Station	\$150,000	\$75,000	\$50,000	\$175,000	\$50,000
Police Station	\$62,000	\$31,000	\$31,000	\$62,000	\$31,000
Traffic Signal	\$27,360	\$12,730	\$20,520	\$30,780	\$8,740
Elementary School	\$4,900,000	\$2,300,000	\$3,600,000	\$5,500,000	\$1,600,000
Middle School	\$2,200,000	\$1,600,000	\$1,800,000	\$2,600,000	\$800,000
High School	\$3,200,000	\$2,400,000	\$2,400,000	\$3,600,000	\$1,200,000

### **Construction, Operation, and Cumulative Phase Monitoring Impacts**

The transportation of high level radioactive nuclear waste through Clark County will require the county to embark on an extensive program to monitor the impacts the program will have on the transportation system and the community. These costs will vary with the program phase. During the construction phase of the proposed high level radioactive nuclear waste repository, a minimum requirement of two additional staff members will be needed to monitor the transportation aspects of the DOE's program. Additionally, a modest consulting budget is required in order to engage unique, outside technical expertise.

In the operation phase of the repository, staff would be required to monitor compliance with state and federal laws, and guidelines. These costs will be incurred throughout the lifetime of the program. Transportation impacts to Clark County are indeed significant, even considering the limited information provided in the DEIS and SDEIS. Clark County officials would have been better able to estimate and evaluate potential impacts had the DOE completed a transportation plan prior to site recommendation.

#### **4.4 Impacts Due to Yucca Mountain Operations**

Sec.116 (b)(B)(ii) of the NWPAA states in part that the Secretary shall make funds available to the Affected Units of Local Government “to develop a request for impact assistance under paragraph (2). Section (B) of paragraph 2 defines the areas of concern for the impacts as “economic, social, public health and safety, and environmental impacts.”

The following is a summary of Clark County’s concerns related to the construction, operation and closure of the Yucca Mountain repository. Absent a final repository design and FEIS, it is impossible to fully identify all possible impacts in this regard. Clark County’s concerns in this area relate to quality assurance, work force health and safety, impacts to species, and air quality impacts.

The construction, operation and eventual closure of a repository could have severe economic consequences on Clark County. The most severe and immediate impacts would likely be due to transportation, either routine or with possible and likely accidents.

Beyond transportation, there are however, construction and operational issues that could also have extremely negative economic effects on the County. Even though the actual operation of the proposed repository will occur in Nye County, the effects of stigma and perceived risk are not that easily separated, and thus must be recognized.

Accidents, whether serious or not, will be portrayed by the press as occurring “in the vicinity of, or near Las Vegas.” Considering the known effects of stigma and perceived risk, these accidents may as well occur in downtown Las Vegas. Survey results contained in *Clark County Visitor Survey Report* (UER, 2002) clearly demonstrate the tourists’ perception regarding perceived risks.

##### **Quality Assurance Concerns**

The Yucca Mountain program has a long history of quality assurance problems, problems that in the past have been a consistent inability to follow their own procedures, and lately (May 17, 2001 letter W. Reamer to S. Brocoum) have included computational errors in critical site suitability documents (*Total System Performance Assessment for Site Recommendation*). In addition to these failures there are also Corrective Action Reports issued that deal with model validation and the control of software. The effects of these have not been fully evaluated.



Inability to follow quality control procedures during site characterization can, and has led to the collection of data that either has to be qualified or that cannot be used at all. Inability to follow quality assurance procedures during the loading and sealing of casks with high level radioactive nuclear waste can lead to immediate loss of life, exposure to elevated levels of radiation, or premature and unanticipated failure of disposal casks. The premature failure of disposal casks will most likely not have immediate effects on Clark County, as even a worst case failure would most likely not occur for hundreds of years. An accident involving the release of radiation or the exposure of individuals to levels of radiation beyond that allowed for in regulations could have severe and negative impacts on Clark County. Here again, the role of the media and the effects of stigma and perceived risk become critical elements in evaluating impacts to Clark County from site operations.

For additional details on discrepancies in the areas of mathematical computations, modeling and quality assurance see the following OCRWM-02-D-016, OQA-01-D-146, OQA-01-D-147, BSC-02-D-008, BSC-01-D-142, LVMO-98-D-038, LVMO-00-D-119, LVMO-00-D-118, LVMO-00-D-007, LVMO-00-D-028, BSC-01-D-050, BSC-01-D-051, BSL-01-C-002, BSC-01-D-078, BSC-01-D-088, BSC-01-C-001, BSC-01-D-063, and BSC-01-D-078 (Appendix G).

All of these discrepancies and incomplete studies amount to an unacceptable level of uncertainty as to the suitability of Yucca Mountain as a high level radioactive nuclear waste repository.

#### **Clark County Workforce Impacts**

Negative health impacts on the workers involved with the proposed repository at Yucca Mountain are expected to be much more extensive than the DEIS indicated. With the issuance of the SDEIS and the large proposed fuel blending facility, it is clear that work force exposure during normal operations will increase. It is not possible to fully define this increase as neither the DEIS nor the SDEIS contains a detailed description of the processes involved. Without this information it is impossible to realistically analyze health impacts to the workforce.

The likely employment during the lifecycle of the facility is expected to reach 1,800 persons. Approximately 90% of these workers will, based on historical trends, live in Clark County.

The handling of highly radioactive nuclear waste in the pool storage building will create additional opportunities for accidents. Releases of radioactive materials from accidents may or

may not be contained in the pool storage and blending area. The mixing of spent nuclear fuel assemblies of different sizes and different radiological characteristics from different fuel batches and/or reactors will create numerous opportunities for errors (e.g. insertion of incorrect assembly in disposal canister, insertion of assembly in incorrect disposal canister cell, etc). Deliberate sabotage also becomes easier and more likely with the additional step of fuel handling. Cleanup after accidents will likely increase worker exposures and generate additional health problems.

### **Impacts to Species**

The DOE's assessment of impacts to species in the DEIS is incomplete (see Appendix C). Clark County recently completed a *Multi-Species Habitat Conservation Plan and Environmental Impact Statement* that covers over 80 threatened or endangered species. Further, the county has achieved compliance with the Federal Endangered Species Act. Specifically, Clark County has been able to achieve and maintain a Federal Section 10A Permit as required under the Act. The DOE's activities related to construction, operation, monitoring and closure of a repository could severely compromise Clark County's ability to retain this permit. Loss of this permit, which allows ongoing development and construction activity in Clark County, would severely impact Southern Nevada's economic stability.

Specific concerns about the DOE's proposals in the DEIS and SDEIS are outlined below. These issues are of concern to Clark County because it is engaged in supporting significant conservation actions in areas adjacent to and in the regional vicinity of the repository. For example:

- The regional and range-wide implications of the loss of the unique desert tortoise (*Gopherus agassizii*) populations and the genetic potential of these populations at the northern extremes of this species range, particularly with respect to the implications of increased traffic and habitat disturbance due to construction and operation activities have not been fully considered by the DOE.
- Range-wide implications exist due to increases in raven populations and their increased levels of predation on unique desert tortoise (*Gopherus agassizii*) populations at the northern extremes of this species range due to this activity.
- Discharge of radioactive and toxic effluent would pose a more significant threat than is currently being considered.

- When considering rail corridor routes, particularly in the area of Jean, Nevada, the DOE does not recognize that this corridor would pass through or near the Clark County Desert Tortoise Large-Scale Translocation Study Site (LSTSS) west of Jean. Clark County has invested significant resources in establishing this site and funding studies to investigate the efficacy of translocating displaced desert tortoises. Currently more than 2,000 displaced desert tortoises have been successfully translocated to this site and many more will be translocated over the coming several years. This site is crucial to desert tortoise conservation and management in Clark County. Clark County residents have overwhelmingly supported desert tortoise conservation actions because, in part, displaced tortoises have been humanely provided a wild home at the LSTSS. Threats to the integrity of the LSTSS would jeopardize public support for tortoise conservation efforts.
- The contribution of truck traffic related to this activity and its impact on desert tortoise populations is lacking a consideration of noise and low frequency vibrations.

### **Air Quality Impacts**

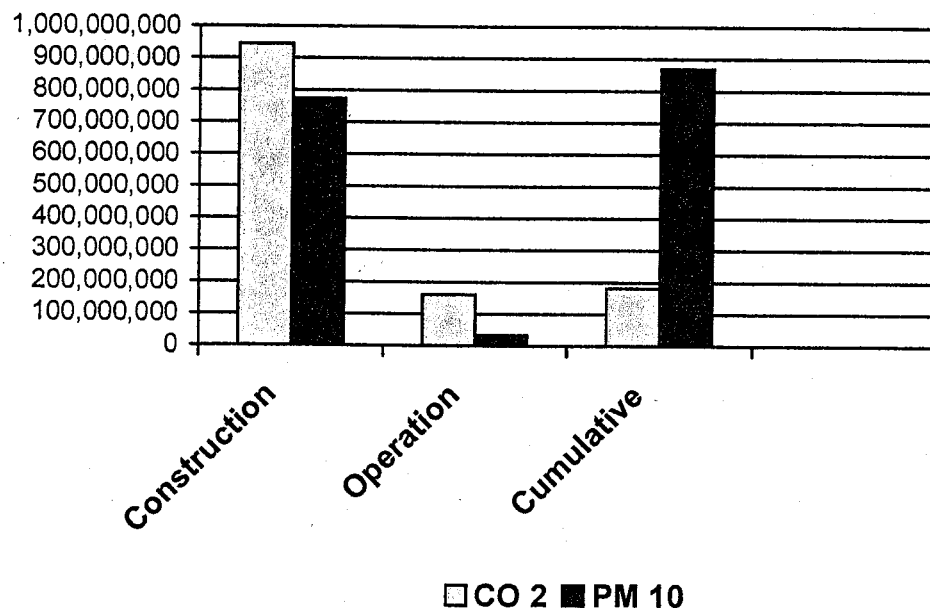
The EPA issued transportation conformity regulations on November 24, 1993 to implement Section 176(c) (4) of the Clean Air Act as amended. The transportation conformity regulations apply to actions of the FHWA and Federal Transit Administration. Actions of other federal agencies, including other transportation agencies are covered by the general conformity regulations issued by the U.S. Environmental Protection Agency (EPA) on November 30, 1993. The DOE is covered by these general conformity regulations.

The Las Vegas valley is classified by the EPA as a serious non-attainment area for carbon monoxide (CO) and particulate matter (PM<sub>10</sub>). The Clark County Regional Transportation Commission is responsible for establishing CO and PM<sub>10</sub> emissions and for demonstrating conformity. Because Clark County is in non-attainment for air quality emissions, the pollutants to be generated by the proposed Yucca Mountain repository project are of concern. The DEIS translated some of the air quality impacts into an estimate of the fatalities caused by the pollutants. However, air quality impacts are important to Clark County for regulatory purposes that are not considered in the DEIS. The construction and operation of Yucca Mountain Project transportation facilities impacts the ability of Clark County to meet national air quality standards. Failure to meet these standards will harm Clark County's ability to obtain federal funding for transportation facilities and will generally harm the quality of life in Clark County.

Vehicular emissions are the primary source of CO pollutants, whereas construction activities are the primary source of dust (PM<sub>10</sub>) in the Las Vegas valley. In addition to vehicle miles of travel, traffic congestion is a significant contributor to increased CO emissions.

The upper boundary of the air quality impacts on the residents of Clark County due to air quality pollution caused by the Yucca Mountain Project and the disposal of low level waste at the Nevada Test Site are shown in Figure 29:

**Figure 29 Grams of Air Pollutants Released in Clark County During the Yucca Mountain Project**



Proposed Yucca Mountain Project activities will substantially degrade Clark County's air quality. Clark County air quality goals would therefore be difficult to achieve and could cause other federal agencies to take punitive action on Clark County due to violations caused by the actions of the DOE over which Clark County would have no authority.

#### 4.5 Public Safety Impacts

The following fiscal impacts reflect an integrated view of impacts to public safety agencies in Southern Nevada. The agencies represented include Las Vegas Metropolitan Police Department (LVMPD), Clark County Fire Department, Clark County Office of Emergency Management, Clark County Health District, Las Vegas Fire Department, Las Vegas Office of Emergency Management, North Las Vegas Police, North Las Vegas Fire Department, Henderson Police Department, Henderson Fire Department, Henderson Office of Emergency Management, Mesquite Police Department, Mesquite Fire Department, Boulder City Police Department, Boulder City Fire Department, Moapa Fire Department, and Moapa Office of Emergency Management, and seven major Southern Nevada hospitals.

These impacts are more fully addressed by UER in the individual agency reports as well as its report entitled *Impacts to Clark County and Local Governmental Public Safety Agencies Resulting From the Yucca Mountain Project* (UER, 2001).

The integrated impact study does not attempt to estimate the total costs to public safety agencies within Clark County government and its local jurisdictions from the Department of Energy's shipping of high level radioactive nuclear waste. Rather, only the incremental or additional costs to governmental entities that would be directly attributable to the siting of the repository at Yucca Mountain and the subsequent shipping campaign are projected. This fiscal impact study of public safety agencies uses a case study approach that provides each county and local government public safety personnel with the three transportation scenarios described in Chapter 3. Public safety personnel were asked to describe how the events would impact their agency. Public safety personnel were then asked to compile a list of resources, training, personnel, equipment, and capital outlays necessary for them to be able to ensure the public health, safety, and welfare and to carry out their agency's mission for each of the three scenarios.

The integrated impact study demonstrates major negative impacts on the public safety agencies within Clark County and its local jurisdictions. Potential vulnerabilities to these agencies and the hospitals in Southern Nevada as well as the fiscal impacts to the public safety agencies have been evaluated. Because of the length of time between now and when shipments may actually begin, the ambiguities surrounding the actual shipment routes and the modal mix, the estimated fiscal projections are tentative. The potential fiscal impacts and vulnerabilities to Clark

County public safety agencies alone, just to the year 2007 when the shipping is proposed to begin, include over \$67.6 million for police services, over \$195.8 million for fire services, and over \$10.6 million for emergency management.

Despite the high degree of professionalism and organization, none of the public safety agencies are currently adequately prepared, trained, or equipped to respond to any of the three high level radioactive nuclear waste shipping scenarios used in the study. This finding is consistent with the 1995 Public Safety Advisory Committee's report that examined public safety needs in Clark County.

The current County Emergency Operations Center that would be the focal point of the County's response to an incident involving high level radioactive nuclear waste is only adequate for a very short duration event.

Southern Nevada hospitals are not adequately equipped, nor are personnel properly trained to effectively manage a high level radioactive nuclear waste incident like that contained in Scenario 3. The hospital system is already strained under current needs, and the projected hospital needs for the area are daunting. This system will not be adequate to handle the events described in the scenarios in this study.

The total projected cost to just the public safety agencies examined in this study to be adequately prepared for a Scenario 3 event is \$359,986,630.

This \$359,986,630 projected fiscal cost for public safety agencies includes \$274.1 million for Clark County; \$45.1 million for the City of Las Vegas; \$23.3 million for North Las Vegas; \$1.3 million for Henderson; almost \$7.0 million for Mesquite; approximately \$400,000 for Boulder City; and \$8.5 million for the Moapa Band of Paiutes. The estimate for Clark County includes all of the fiscal impacts estimated for the LVMPD have been attributed to the County. However, it should be observed that LVMPD annual operating and capital costs are shared between Clark County and the City of Las Vegas.

The largest projected costs to these public safety agencies fall under the categories of facilities, equipment, personnel, and training. For police services, the projected fiscal cost is over \$72.5 million for the communities examined in this study. The Fire Departments' projected fiscal costs total over \$275.3 million, and the Offices of Emergency Management fiscal cost projections total over \$12 million. These cost projections are for the agencies to be prepared for a Scenario 3 incident beginning in 2010. The projections do not include costs that will be recurring such as vehicle and equipment replacement costs or the dollar costs of training new employees after 2007.

Hence, the fiscal cost projections in the report will tend to underestimate (are conservative) some of the fiscal impacts to the public safety agencies.

Additional Haz/Mat Radiological personnel, training, and equipment are viewed as critical needs among the public safety agencies. The hospitals lack sufficient decontamination facilities, equipment, and trained personnel.

Current planning activities are progressing, regional public safety organizations are beginning to grapple with the problems posed by high level radioactive nuclear waste shipments, and a Southern Nevada hospital system approach is developing with the help of the Clark County Health District. There is a critical need for a strong regional effort to ensure that the County, the municipalities, and the Moapa Band of Paiutes are prepared for high level radioactive nuclear waste shipments. Additional resources for the hospitals and the Health District are not projected in this study, only their training and equipment needs.

Figures 30 through 33 below list additional anticipated public safety costs resulting from the repository. These costs reflect combined estimated personnel, training, and equipment costs for police, fire and emergency management for the Southern Nevada jurisdictions covered by this analysis.

**Figure 30 Total Projected Costs by Community/County**

	Police	Fire	Emergency Management	Cost
<i>Clark County</i>	\$67,686,369	\$195,896,055	\$10,614,385	\$274,196,809
Las Vegas	*	\$44,596,793	\$561,265	\$45,158,058
North Las Vegas	\$711,021	\$22,421,402	\$207,623	\$23,340,046
Henderson	\$952,427	\$285,933	\$148,569	\$1,386,929
Mesquite	\$2,828,960	\$4,151,451	***	\$6,980,411
Boulder City	\$404,880	**	**	\$404,880
Moapa	N/A	\$8,038,644	\$480,853	\$8,519,497
Totals	\$72,583,657	\$275,390,278	\$12,012,695	\$359,986,630

\* Las Vegas Metro provides services to both Clark County and the City of Las Vegas

\*\* Because of the projected distance to the high level radioactive nuclear waste shipment corridor, Boulder City estimated impacts only for the Police Department.

\*\*\* In Mesquite, Emergency Management is a function of the Fire Department and thus costs are combined under Fire.

**Figure 31 Projected Fiscal Impact Costs on Metro Police Department**

	Personnel	Training	Equipment	Cost
<i>Clark County</i>	\$17,582,464	\$8,080,604	\$42,023,301**	\$67,686,369
Las Vegas	*	*	*	*
North Las Vegas	0	\$711,021	0	\$711,021
Henderson	\$510,195	0	\$442,232	\$952,427
Mesquite	\$1,876,446	\$34,754	\$917,760	\$2,828,960
Boulder City	\$186,000	\$18,880	\$200,000	\$404,880
Moapa	0	0	0	0
<b>Totals</b>	<b>\$20,155,105</b>	<b>\$8,845,259</b>	<b>\$43,583,293</b>	<b>\$72,583,657</b>

\*Las Vegas Metro Police Department provides services to both Clark County and the City of Las Vegas

\*\* Equipment includes capital costs

**Figure 32 Projected Fiscal Impact Costs on Fire Department**

	Personnel	Training	Equipment	Cost
<i>Clark County</i>	\$25,991,241	\$13,615,031	\$156,289,783**	\$195,896,055
Las Vegas	\$5,711,370	\$4,044,588	\$34,840,835	\$44,596,793
North Las Vegas	\$3,851,129	\$5,121,073	\$13,449,200	\$22,421,402
Henderson	\$140,592	\$70,296	\$75,045	\$285,933
Mesquite	\$1,874,429	\$333,133	\$1,943,889	\$4,151,451
Boulder City	0	0	0	0
Moapa	\$1,791,292	\$94,584	\$6,152,768	\$8,038,644
<b>Totals</b>	<b>\$39,360,053</b>	<b>\$23,278,705</b>	<b>\$212,751,520</b>	<b>\$275,390,278</b>

\*\* Equipment includes capital costs

**Figure 33 Projected Fiscal Impact Costs on Offices of Emergency Management**

	Personnel	Training	Equipment	Cost
<i>Clark County</i>	\$340,340	\$9,552	\$10,264,493**	\$10,614,385
Las Vegas	\$561,265	0	0	\$561,265
North Las Vegas	0	\$207,623	0	\$207,623
Henderson	\$61,463	\$13,401	\$73,705	\$148,569
Mesquite	0	0	0	0
Boulder City	0	0	0	0
Moapa	\$203,353	0	\$277,500	\$480,853
<b>Totals</b>	<b>\$1,166,421</b>	<b>\$230,576</b>	<b>\$10,615,698</b>	<b>\$12,012,695</b>

\*\* Equipment includes capital costs



The health and safety of Clark County residents and visitors are of paramount concern to local elected officials. The analysis contained in this report is conservative and realistic, having been based on the experience and knowledge of public safety professionals. This analysis should be carefully considered by those who are a part of the decision-making process for Yucca Mountain, as it is an integral component to the implementation of the Yucca Mountain Project.

#### **4.6 Non-Public Safety Governmental Impacts**

The following Clark County non-public safety governmental departments provided the projections contained in this subchapter: Administrative Services, Assessor, Aviation, Building Department, Business License, Comprehensive Planning, County Clerk, District Attorney, Finance, General Services, Health District, Parks and Recreation, Public Communications, Public Works, Recorder's Office, Social Services, and Treasurer's Office.

In addition, information was provided by the following agencies: Regional Flood Control District, Regional Transportation Commission, Clark County Sanitation District, and Clark County School District. Although these agencies are separate from general Clark County government, it is important to demonstrate the interdependent nature among them. Further, it is important to understand the combined impacts to Clark County as a region.

This study provides a first estimation of the range and magnitude of potential impacts to Clark County non-public safety governmental agencies as a result of the DOE's proposal and compliments an earlier study of potential impacts to the public safety agencies within Clark County and its incorporated jurisdictions, summarized in Chapter 4.5.

This study does not attempt to estimate the total costs to the Clark County government from the DOE's shipping of high level radioactive nuclear waste, but only the incremental or additional costs to governmental entities that would be directly attributable to the siting of the proposed repository at Yucca Mountain and the subsequent shipping campaign. The analysis for this set of impacts used the same case study approach as Clark County's public safety agencies and is similar to the methodology used by the State of Nevada over the last decade to identify impacts to governmental agencies. County agency personnel were presented with the three transportation scenarios described in Chapter 3, and were asked to describe how each of the events would influence their agency. County personnel then provided a first estimation of the additional

resources, training, personnel, equipment, and capital outlays that would be required by their agency to carry out their responsibilities under each of the three scenarios.

The results of the study indicate significant negative impacts on many of Clark County governmental agencies. The potential vulnerabilities, as well as a first estimation of the likely fiscal impacts to these agencies, are described in the report entitled *Non-Public Safety Governmental and Fiscal Impact Report* (UER, 2001). Because of the length of time between now and when shipments may actually begin, the ambiguities surrounding the actual shipment routes, and the modal mix, the results are very tentative.

The potential fiscal impacts to these non-public safety governmental agencies in order to prepare for the commencement of the high level radioactive waste shipments to Yucca Mountain (adjusted to the year 2007 as reflected in the DEIS) are likely to reach almost \$40 million. These include almost \$6.3 million in additional personnel costs; almost \$20 million in expenditures for radiation health and safety, approximately \$13 million in equipment and capital expenditures, as well as communication training, changes to various County planning documents, and public outreach.

Over the proposed 24-year duration of the shipment campaign, the cost for personnel would reach \$229 million, while the cost for training, plan development and public outreach would reach almost \$123 million. Other capital and equipment costs were only estimated through the commencement of the proposed program in 2007 since projecting the diverse nature of these costs were beyond the scope of this report.

In addition, these estimates are quite conservative. Although most agencies indicated that they would likely experience adverse fiscal impacts on their personnel costs in order to prepare for the proposed repository and its related high level radioactive nuclear waste shipment campaign, only eight agencies were able to quantify the potential fiscal impacts to their agencies. Many of the agencies identified additional studies required to forecast the impacts to their agencies.

If a Scenario 2 type of high level radioactive nuclear waste incident were to occur, many of the agencies indicated that they would experience additional impacts. However, only three of the agencies felt that they could quantify these impacts based on the available information. According to the estimates provided by these three agencies, a Scenario 2 event would result in another \$1 million in expenditures, primarily for overtime and some additional training. As studies are completed, agencies should be better able to more accurately and completely define vulnerabilities.

The potential magnitude of a Scenario 3 high level radioactive nuclear waste accident was the most troubling to those interviewed. The fiscal impacts within just a one-year period were estimated by twelve non-public safety agencies at almost \$122 million. These include an additional \$6 million in personnel costs; over \$645 thousand in additional training costs; and almost \$47 million in equipment and capital costs, a decline in revenues of \$7 million and additional medical expenditures of \$61.5 million. It should be noted that many of these costs would likely last for well over the year that has been estimated in this report.

### **Preparedness Impacts**

Among the 21 agencies interviewed, only three indicated that they are unlikely to incur impacts as a result of needing to prepare for the DOE's proposed repository and its related shipment campaign. Among the eighteen other agencies, extensive lists of impacts were identified that were likely to occur as a result of their need to prepare for the high level radioactive nuclear waste shipment campaign. Approximately half of these agencies were able to identify at least to a limited extent, the magnitude of potential fiscal impacts to their agency. The nature of the impacts can be grouped into the following categories:

- Personnel

- Training, Planning, and Public Outreach

- County Expenditures and Revenues

- Public and Environmental Health

These costs are summarized in Figure 34 below

**Figure 34 Summary Preparedness Costs for Non-Public Safety Agencies**

AGENCY	PERSONNEL*	EQUIPMENT AND CAPITAL COSTS**	TRAINING AND PLANS*	FISCAL IMPACTS
Administrative Services			\$184,481	\$184,481
Aviation	\$3,137,924	\$9,849,703	\$1,506,596	\$14,494,223
Comprehensive Planning	\$882,058		\$2,248,560	\$3,130,618
District Attorney	\$139,406			\$139,406
General Services	\$143,896			\$143,896
Health District	\$383,721	\$3,000,000	\$1,048,083	\$4,431,804
Parks and Recreation	\$263,808	\$112,568	\$491,950	\$868,326
Public Communications			\$368,962	\$368,962
Regional Transportation Commission*, **	\$455,658		\$12,500,000	\$12,955,658
School District	\$863,371		\$1,430,763	\$2,294,134
Social Services			\$119,913	\$119,913
TOTALS*, **	\$6,269,842	\$12,962,271	\$19,899,308	\$39,131,421
CUMULATIVE TOTALS 2007 - 2031	\$228,593,827		\$122,669,481	\$351,263,108

\* Personnel, training, information development/distribution, and plan development costs are adjusted using a 3% inflation factor through 2007.

\*\* Equipment, Facilities/Capital costs are adjusted using 5% inflation factor through 2007.

### Personnel Impacts

Thirteen agencies indicated that they would experience personnel impacts merely to prepare for the DOE's proposed high level radioactive nuclear waste shipment campaign. Among the eight agencies that estimated the fiscal impacts in the area of personnel, the largest impact was estimated by the Department of Aviation.

- Department of Aviation would require 60 bus drivers and 40 buses to be maintained for evacuation purposes if the DOE proceeds with the high level radioactive waste shipments. The airport's current evacuation plan calls for the use of public buses and school buses and that if a nuclear waste incident were to occur, it would be unlikely that these buses would be available, since the School District would need to prioritize transporting students instead of airport passengers and staff. The personnel costs associated with hiring these drivers would be over \$3.1 million.

- Department of Comprehensive Planning would require over \$880,000 to maintain program oversight staff through the Yucca Mountain licensing phase. This includes the addition of a regulatory analyst and a geographic information systems technician.
- Department of Parks and Recreation would require four additional police officers and an information management specialist.
- General Services would require additional staff to process contracts and manage purchase and lease agreements from other County agencies affected by the high level radioactive nuclear waste shipment campaign.
- District Attorney's Office needs to provide support for the increased litigation that is expected, particularly along the northern Beltway if that route is selected for the high level radioactive nuclear waste shipment campaign.
- Regional Transportation Commission identified the need for a transportation modeler, engineer, and planner as well as support staff if the DOE proceeds.
- The Clark County School District would require over \$860,000 to implement their policy of "shelter in place," if the DOE proceeds with the high level radioactive waste shipments.
- The Clark County Health District would require an additional four staff to conduct the extensive education and public information program that will be needed to inform Clark County residents about the nature and risk associated with high level radioactive nuclear waste shipments.

County departments such as the Assessors Office, the Clerk's Office, Finance, and the Recorder, all indicated that they would also have personnel impacts that would require further study to quantify the magnitude of these impacts.

Among those agencies who did make a first estimation of impacts, the personnel requirements to prepare for the commencement of the program was almost \$6.27 million. When these personnel costs are forecast out over the 24 year life cycle of the shipment campaign described in the DEIS, the fiscal cost to Clark County reaches almost \$229 million.

#### **Preparedness: Training, Planning, and Public Outreach Impacts**

The largest category of fiscal impact for the non-public safety agencies is in the area of training and plan development. The Regional Transportation Commission indicated that they will need upwards of \$12.5 million to conduct impact analysis of the alternative routes, as well as to conduct impact studies including pavement, air quality, and land use studies once the DOE has

selected the transportation routes they would use for the high level radioactive nuclear waste shipments.

The Department of Comprehensive Planning will likely need upwards of \$2.25 million a year through the site characterization phase in order to perform oversight studies and detailed fiscal impact analysis, develop a monitoring program, and carry out regulatory and policy analysis. If the DOE proceeds with its shipment campaign, Clark County will need to continue to provide monitoring of key indicators in order to identify impacts and to provide policy support as the proposed Yucca Mountain Project evolves. The Department of Comprehensive Planning, as well as the Assessor's Office, Department of Parks and Recreation, Department of Social Services and the School District all commented on the impacts the high level radioactive nuclear waste shipment campaign will have on the planning process. They all noted that current planning activities are largely driven by accessibility. Thus, facilities such as hospitals, intermediate care facilities, child and adult daycare, schools, parks, and other recreational facilities are located in areas that are easily accessible to highways. If the high level radioactive nuclear waste shipment campaign proceeds, the County will likely have to reassess its entire approach to planning to incorporate the additional risk factors associated with high level radioactive nuclear waste transport.

The Department of Aviation noted that they would need to make additions to their emergency response plan and would require a detailed risk assessment in order to update their airport evacuation plan. The current evacuation plan calls for utilizing school buses to evacuate McCarran Airport. In the event of a high level radioactive waste accident, it is unlikely that the Clark County School District would make these busses available, needing instead to provide for the safe transport of their students. The costs for these studies were forecast at over \$675,000. The Department of Aviation also noted "Rad 1" training will be needed for the approximately 300-security and traffic control personnel at the airport. This will result in additional costs of \$830,000 per year throughout the duration of the shipment campaign.

The Department of Parks and Recreation identified the need to conduct detailed analysis of current and future park and recreation facilities to determine potential visitor impacts, as well as, evacuation and closure strategies. These studies were forecast to cost upwards of \$490,000.

The Neighborhood Services Division within Administrative Services and Public Communications also noted the need for ongoing public outreach activities, including outreach through neighborhood groups, and other appropriate education and outreach activities in order to

address residents' concerns about the shipment campaign. The Public Communications staff also noted that all Clark County public information personnel would need risk communication training on an annual basis so that they would be prepared to communicate effectively with the public in case of a high level radioactive waste incident. The additional public information and risk communication costs were forecast at over \$550,000 annually throughout the duration of the shipment campaign. These costs are in addition to the four personnel identified by the Health District as needed to provide information and education about the health risks associated with the shipment campaign.

The Clark County School District indicated that they would require approximately \$1 million in order to conduct a study detailing the impacts to the school system and to their finances that will result if the DOE proceeds with the high level radioactive nuclear waste shipment campaign. In addition, they believe that training costs and annual training exercises will result in another \$430,000 in expenses for the District. The Department of Social Services also indicated that their 65 social workers would also need "Rad 1" training at a cost of almost \$120,000 per year.

Among the nine agencies that were able to provide first cut cost estimations for training, planning, and public outreach, the fiscal impacts just to prepare for commencement of the program is almost \$20 million. Over the 24-year lifecycle of the shipment campaign discussed in the DEIS, these additional costs to Clark County will grow to almost \$123 million.

#### **Preparedness: Clark County Expenditures and Revenues**

The Department of Aviation indicated that in order to develop an effective evacuation plan for the airport to respond to a high level radioactive nuclear waste accident event, if it occurred in proximity to the McCarran Airport, would require the acquisition of 40 buses at a cost of over \$2.8 million. As noted previously, currently the Department is dependent on the Clark County School District to supply buses for an airport evacuation. This would not be a viable alternative in the event of a high level radioactive waste incident. The Department of Aviation also indicated that they would need 50 early warning monitoring instruments in order to protect the airport if the DOE proceeds with the high level radioactive nuclear waste shipment campaign along I-15 adjacent to the McCarran Airport. The cost for these monitors would be approximately \$7 million.

The Department of Parks and Recreation noted that they would need 4 vehicles for the additional Parks Police that will be required at a cost of approximately \$113,000.

The Health District indicated that they would need a computer system for environmental health inspection data and enhancements to the Emergency Management System communication system currently being deployed at costs of upwards of \$3 million.

It was also noted that Clark County pays for additional services through the additional funds that are generated from growth in the local economy. Based on current growth rates, it was estimated that it would take 50 years for the County to be able to provide the additional \$275 million identified in the *Review of Impacts to Clark County Public Safety Agencies Resulting from the Yucca Mountain Project* (UER, 2001).

It was further pointed out that the County would need to determine whether insurance rates would go up on County facilities and for employee health insurance because of the DOE's proposed high level radioactive nuclear waste shipment campaign. There could be an increase in residential property insurance rates that could make living in the County less attractive.

A direct link exists between revenues and the level of County services that can be provided. If the high level radioactive nuclear waste shipment campaign results in a reduction in revenues from property value diminution and stigma related reductions in visitor generated taxes, staffing levels would be reduced and the quality of County services would subsequently decline. The debt rating for the County could suffer, leading to an increase in the cost of capital.

#### **Preparedness: Clark County Public and Environmental Health**

In order to establish a baseline for monitoring radiation related health impacts, the Health District might consider testing all school children. Air Quality State Implementation Plans may require adjustment in the future to account for air quality issues associated with the high level radioactive nuclear waste shipments.

#### **Scenario 2: Additional Personnel Impacts**

While many of the agencies interviewed indicated that they would experience personnel impacts from a Scenario 2 high level radioactive nuclear waste shipment event, only General Services and the Recorder's Office felt that they could provide a first cut estimation of the fiscal level of impacts (Figure 35). Under this scenario, General Services indicated that they would likely need another \$50,000 to support temporary overtime costs related to contract management activities associated with an incident. The Recorder's Office indicated that they would likely experience a 10% increase in personnel costs during the period immediately following the incident as a result of the transference of property from County residents migrating from the area.



### Scenario 2: Additional Training, Planning, and Public Outreach Impacts

The Public Communications office noted that there would need to be additional public outreach activities if a Scenario 2 high level radioactive nuclear waste shipment incident occurred. They estimated that the costs of such activities would be greater than \$600,000 (Figure 35).

**Figure 35 Summary of Scenario 2 Additional Needs, Vulnerabilities, and Impacts**

AGENCY	PERSONNEL*	TRAINING AND PLANS*	FISCAL IMPACTS
General Services	\$50,000		\$50,000
Public Communications		\$614,937	\$614,937
Recorder	\$284,984		\$284,984
Social Services			
<b>TOTALS*, **</b>	<b>\$334,984</b>	<b>\$614,937</b>	<b>\$949,921</b>

\* Personnel, training, information development/distribution, and plan development costs are adjusted using a 3% inflation factor through 2007.

\*\* Equipment, Facilities/Capital costs are adjusted using 5% inflation factor through 2007.

Based on the available data, Clark County agencies identified almost another \$1 million in impacts above those costs associated with preparedness if a Scenario 2 type event occurred during the shipment campaign.

### Scenario 3: Additional Personnel Impacts

If a Scenario 3 level event were to occur, virtually all of the County departments and agencies interviewed would experience adverse personnel impacts:

- The Business License Department indicated that they would require 15 additional auditors, 7 investigators, and support staff to handle the larger number of audits that would result as tourism downturns resulted in turnover in business ownership and the termination of business operations. Associated personnel costs for these activities could reach almost \$1.7 million.
- The Department of General Services estimated that they would need another 18 staff to handle all of the purchasing and contract activities that would result from this type of event costing upwards of \$1.3 million.
- The District Attorney's Office stated that a Scenario 3 event would significantly increase the level of litigation likely requiring three additional civil attorneys and one criminal attorney, as well as support staff. The cost for these services would run approximately \$578,000 per year for two years.

- The Department of Administrative Services noted that they would likely need four analysts within the Center for Strategic Management to deal with policy related issues and 6 additional public outreach personnel to work with the plethora of community issues that would arise from an event of this type. The Administrative Services personnel costs associated with these activities could be \$575,000 or more per year.

Similarly, other agencies including the Health District, the County Clerk, the Treasurer, the Recorder, the Department of Parks and Recreation, and Public Communications identified significant fiscal impacts on their personnel costs. In total, those agencies that were able to provide a first estimation of impacts forecast additional personnel costs of nearly \$6 million above those previously identified related to preparedness.

### **Scenario 3: Additional Training, Planning, and Public Outreach Impacts**

The Department of Administrative Services emphasized that if a Scenario 3 event were to occur, the magnitude and type of public outreach efforts that would be required would grow dramatically. While it is very difficult to estimate costs for an event of this type, the first cut estimation for only the Neighborhood Services needs were for an additional \$370,000 above those costs identified for preparedness. As noted above, Public Communications also identified additional public outreach needs that they would address through the hiring of two additional staff.

### **Scenario 3: Clark County Expenditures and Revenues**

The Department of Social Services estimated that their entire Medical Assistance budget would be exhausted in a few days if a Scenario 3 event occurred. It was noted that the demand for medical services to address both accident and stress related injuries would far exceed resources. This could result in expenditures in the period immediately following the accident of over \$61.5 million. Further, it was noted only Social Services is authorized to write County checks without prior Board of Commissioner's authorization and thus, would likely be called on to make expenditures for other critical services. The County Clerk indicated that her office generates significant revenues from issuing marriage licenses and from deputy clerks solemnizing marriages. A great deal of this revenue is generated from tourists who come to Las Vegas to get married. If a Scenario 3 event were to occur, the number of tourists requesting marriage licenses will drop substantially. The County Clerk estimates that this could reduce revenues by almost \$7 million a year. Figure 36 summarizes these impacts.

**Figure 36 Summary of Scenario 3 Additional Needs, Vulnerabilities, and Impacts**

AGENCY	PERSONNEL *	EQUIPMENT AND CAPITAL COSTS**	TRAINING AND PLANS*	REVENUE ***	RANGE OF FISCAL IMPACTS
Administrative Services	\$575,580		\$368,962		\$944,542
Aviation			\$276,722		\$276,722
Business License	\$1,678,778	\$422,130			\$2,100,908
County Clerk	\$383,721			\$6,946,328	\$7,330,049
District Attorney	\$578,041				\$578,041
General Services	\$1,295,057				\$1,295,057
Health District	\$503,633	\$307,468			\$811,101
Parks and Recreation	\$191,860	\$46,073,792			\$46,265,652
Public Communications	\$167,878				\$167,878
Recorder	\$284,984				\$284,984
Social Services				\$61,493,693	\$61,493,693
Treasurer	\$287,790				\$287,790
<b>TOTALS*, **</b>	<b>\$5,947,322</b>	<b>\$46,803,390</b>	<b>\$645,684</b>	<b>\$68,440,021</b>	<b>\$121,836,417</b>

\* Personnel, training, information development/distribution, and plan development costs are adjusted using a 3% inflation factor through 2007.

\*\* Equipment, Facilities/Capital costs are adjusted using 5% inflation factor through 2007.

\*\*\* Shown as a positive number to identify the total impacts to Clark County

This non-public safety impact analysis is, as noted, of a preliminary nature. As more is discovered about the DOE's final program proposal these figures would likely require modification.

## 5.0 Native American Concerns

To provide a complete understanding of impacts to all communities addressed in the Clark County Impact Assessment Report, the effects on Native American communities must be considered in ways that identify and reflect the range of impacts from a tribal perspective.

From a tribal perspective, the Yucca Mountain area holds special significance to the Native Americans most likely to be impacted by the project. The mountain itself is a very old border between the Western Shoshone and the Southern Paiute. Yucca Mountain is considered sacred, holy ground by the Western Shoshone, Southern Paiute, and Owens Valley tribes. This area is home to many traditional plant and animal species, rock art, and burial sites. Beyond the spiritual significance of Yucca Mountain, the Native Americans place historical and political significance to the area as well, especially with respect to the Treaty of Ruby Valley, established in 1863. Many legal and political battles have been fought over the issues stemming from this treaty over the years.

Federal guidelines CEQ define “adverse effects” for minority populations as follows:

“... the totality of significant individual or cumulative human health or environmental effects, including interrelated social and economic effects, which may include, but are not limited to, bodily impairment; infirmity; illness or death; air, noise, and water pollution and soil contamination; destruction or diminution of aesthetic values; destruction or disruption of community cohesion or a community’s economic vitality.”

Considering this definition, then, it is not surprising that the DOE fails to recognize impacts to minority populations, including Native Americans.

Arguably, minority populations in Southern Nevada would be most negatively affected by transportation of high level radioactive nuclear waste. For example, both Native American communities located within Clark County, the Moapa Band of Southern Paiutes (the Moapa) and the Las Vegas Paiutes, are located adjacent to highway and rail routes for the transport of high level radioactive nuclear waste to Yucca Mountain. Beyond the potential for adverse socioeconomic consequences to the tribes due to the transportation of nuclear waste common to all communities, it is appropriate to consider impacts related to the cultural and spiritual aspects specific to Native Americans.

In the Las Vegas urbanized area, a large percentage of minority and low-income residents live near truck and rail transportation routes. It is estimated, therefore, that these communities

would also be further negatively influenced by decreases in property values, the defection of local banks and businesses, as well as being subject to a disincentive to invest in these communities. A negative effect on the economy could result in job losses, especially at entry-level and low-level positions, which would most quickly and severely affect low-income and minority individuals.

Clark County has, for several years, entered into interlocal agreements with both the Las Vegas and Moapa Paiute bands in order to facilitate program oversight, information sharing, and impact assessment. This has resulted in the opportunity for the affected Native American communities to participate in the impact assessment process. For example, Clark County's consultants, UER, helped the Moapa to prepare an extensive public safety report to assess their preparedness and response requirements (see Chapter 4, Subchapter 4.5). Negative impacts to Native American populations can also be derived from the property value report prepared by UER (see Chapter 4, Subchapter 4.2).

The assessment of impacts on the Moapa shows that shipments of nuclear waste through or near the Moapa Reservation will have adverse impacts on the tribe's culture and spiritual traditions as well as social well being. Some of these concerns focus on the possible loss of tribal farms which are not only important economically but also culturally as it represents renewed economic independence, a return to farming and a possible return of tribal members who have previously left the reservation. There is concern that because of the small population and earlier displacements, that a transportation accident near the community may result in permanent displacement from their traditional lands and restricting access to traditional areas for food gathering and other activities.

Because there is minimal public safety capacity on tribal lands today, basic capacity building to prepare for a possible accident will require major investments in equipment, facilities, planning, and training. In addition, the Moapa are dependent on revenues from their gaming center/store that is located along I-15. If the spent fuel shipments result in fewer customers, especially in the event of an accident, then the financial well being of the Moapa could be adversely impacted.

Further, documented evidence of past practice indicates that the DOE has had difficulty providing financial support through new jobs, highway funding, or the impacts caused by emergency conditions in related nuclear waste projects such as the WIPP site in New Mexico. Understandably, the Native American communities of Southern Nevada do not have much confidence their needs would be considered any differently.

## **6.0 Public Involvement and Outreach**

### **Introduction**

Clark County's Nuclear Waste Program began in earnest in 1988 after Clark County was designated as an Affected Unit of Local Government. The provision of public information and outreach are approved activities under the federal appropriation that funds the County's program.

Clark County can point to many examples of effective public involvement over the course of its Nuclear Waste Program. For example, in 1999 and 2000, the Nuclear Waste Division conducted an extensive outreach effort focused on the release of the DOE's DEIS and Clark County's response to the DEIS. Town advisory boards, citizens advisory councils, city councils, and community groups all had opportunities to receive information and to submit their comments for consideration by the DOE. As a matter of interest, Clark County has received no response from the DOE to any of the comments submitted on the DEIS.

In January 2001, Clark County launched a program known as "INFORM." This program was designed and implemented to establish and maintain an informative, proactive community relations effort directed to all residents of Clark County. Key objectives of the program included raising the level of knowledge and awareness of the proposed Yucca Mountain Project. Equally important has been the notion of providing a means for meaningful public involvement and opportunities to comment on not only various aspects of the DOE's program, but Clark County's efforts as well. Clark County officials recognized the need for public participation and actively sought to improve public involvement, as well as provide opportunities for residents to make their opinions known.

Based on a public perception analysis conducted at the beginning of the INFORM program, key issues were identified, and tactics were employed to establish a dialogue with the public, with emphasis on public participation.

The INFORM program presented timely and accurate information that was accomplished through a strategic plan, and tactics that included the following: informational presentations, public response mediums, mass media, and the mailing and distribution of fact sheets and other information.

Clark County's public outreach efforts have achieved the desired results. One key result is heightened awareness of Yucca Mountain issues and concerns (Appendix H). Another is the growing list of resolutions in opposition to the project (Appendix A).

### **Public Response**

Public response was gathered in several ways, including testimony during County-sponsored public meetings, e-mail, hotline calls, and questionnaires available at public meetings. Additionally, two community-wide surveys were conducted. The complete results of these surveys are included in Appendix H.

Seventy-three percent of these overall responses reflect opposition to the proposed Yucca Mountain Project. Nine percent of the overall responses were in favor of the project, and the remaining 18% are undecided. Eighty-seven percent of Clark County's residents are extremely concerned about transporting high-level nuclear waste through the County. Approximately 92% indicated concern about emergency response in case of a nuclear waste transportation accident. Financial impact of a potential transportation accident is of extreme importance to 88.5% of respondents. A vast majority, 91%, rated potential exposure to radiation along the transportation route as "extremely important."

Seventy-one percent of the hotline responses accounted for those who oppose the project. Reasons for opposition included fears of transportation accidents, radiation leakage, health risks, safety and overall quality of life in Nevada for present and future generations.

### **Community Opinion Surveys**

In December 2000 a research team from UNLV was used to obtain a random sample of public opinion by Clark County residents from the Las Vegas valley. The survey goals were to determine the level of awareness about the Yucca Mountain Project, determine the public's perception of Clark County's position on the Yucca Mountain Project, and obtain comments from the general public about the Yucca Mountain Project.

A total of 1,018 responses were obtained from the 2000 survey. In face-to-face interviews based on a standard set of questions, surveys were conducted in English, Spanish, and Mandarin Chinese. Nearly 80% of the respondents were aware of the Yucca Mountain Project. Most (632) want more information. While the majority of residents did not know what Clark County's position on Yucca Mountain Project is, most (606) wanted to know where Clark County Commissioners stand on this issue. More than half of the respondents consider the transportation of nuclear waste unsafe or very unsafe. Of those interviewed, 304, or approximately 30% of the

total offered comments. Opinions ranged from "Don't bring it here," to "It's good for the economy." A significant number expressed the need for more and better information. Several suggested nuclear waste be stored where it is currently generated. When given an opportunity to make a comment, opinions against the project outnumbered those in favor of it by 10 to 1. Approximately 100 responses were either neutral or not applicable in terms of a position about the Yucca Mountain Project.

The 2000 survey was a benchmark survey. In November 2001, another survey under identical conditions using a similar team of UNLV students, surveyed 1,018 residents in similar locations. Comparatively, public awareness about the Yucca Mountain Project rose 4% over the one-year period. Public concerns about transportation of high-level nuclear waste was down by 5%; however, the public's desire for additional information was up by 7% on transportation issues and 9% on Clark County's position. Public awareness of the County's position on the project rose by 8%. Both surveys indicated a clear desire for more and better information. For example, in the November 2001 survey, more than 55% asked for additional public information.

Responses from the 2001 survey were again varied. Of the 1,018 total respondents interviewed, 31% volunteered additional comments. Among those, only 5% (15 of 314 comments) were clearly in favor of the project, with the overwhelming majority against the project. Comments ranged from "Not in Nevada," to "OK if made safe." Many people requested additional information. There seems to be a perception that the Board of County Commissioners has the decision-making authority to allow or reject the Yucca Mountain Project. It is also clear from the results that the public is unsure about the County's role and responsibility in the Yucca Mountain Project.

Public comments obtained in the surveys are significant because they were taken randomly, rather than from individuals motivated to attend a public meeting and express a view for or against the project. A complete transcript of public comments received through both surveys as well as survey statistical summaries are included in Appendix H. Other feedback mechanisms should be conducted in 2002 to measure the INFORM program effectiveness.

Clark County will continue its outreach efforts to ensure public participation, and to disseminate information on the County's position roles and findings related to the proposed Yucca Mountain Project. Significantly, the impacts over which the public has continually expressed concern correspond to those focused on for many years by Clark County, and are addressed in this Impact Assessment Report.



## **7.0 Summary and Recommendations**

### **7.1 Summary**

Clark County, home of “The Entertainment Capital of the World,” has enjoyed many years of economic growth. The continued economic vitality of the Southern Nevada region depends on an intricate balance of factors all coming together to achieve a strong sense of community and high quality of life for all residents. Any significant threat to that balance could topple the region’s economy.

It is hoped that the decision makers who will act on the proposed high level radioactive nuclear waste repository at Yucca Mountain over the next several years will consider the following as outlined in the Impact Assessment Report:

#### **Gaming Impacts**

According to virtually every gaming industry representative interviewed for the County’s gaming impacts study, the most serious risk is from the stigma that will result if there is any accident of any kind involving the shipment of high level radioactive nuclear waste.

Transportation of high level radioactive nuclear waste along Clark County’s roadways, even without a serious accident, could seriously compromise Clark County’s tourism based economy.

#### **Property Value Impacts**

Stable property values are a necessary component for the stability of Clark County’s tax structure. Any threat to a government entity’s ability to rely on property taxes as a stable source of income impacts not only that entity’s ability to operate, but has a “domino” effect on all aspects of what people expect and deserve in terms of community livability.

Depending on the transportation scenario applied, property value decreases directly resulting from transportation of nuclear waste through Clark County range from 2% to 30%, resulting in property value losses up to \$1 billion. An additional economic analysis by UNLV estimates potential economic impacts over the course of the DOE’s proposed shipping campaign to be in the billions of dollars.

#### **Transportation Impacts**

Transportation system impacts are defined as changes to the operation, condition, and performance of the County’s transportation network. The DOE must address the direct, indirect,

and cumulative impacts of transporting waste through Clark County to Yucca Mountain. Several impacts addressed in this report dovetail from the issues surrounding the transportation of high level waste through Clark County.

### **Impacts Due to Yucca Mountain Operations**

Although several impacts addressed in this report relate to transportation, impacts due to Yucca Mountain operations also pose significant risk. Absent a final repository design and the issuance of a FEIS, it is impossible to identify the full range of impacts. Concerns over quality assurance issues, workforce impacts, impacts to species, and air quality impacts are substantial.

### **Public Safety Impacts**

This assessment of these impacts includes the incremental or additional costs to governmental entities that would be directly attributable to the proposed repository. Under Scenario 3, costs would likely approach \$360 million. The majority of these costs are attributable to Clark County, with the largest portions designated for facilities, equipment, personnel, and training. Clark County's costs alone would be over \$274 million.

### **Non-Public Safety Impacts**

Most county departments and related agencies interviewed expressed concern over the magnitude of the impacts they each anticipate. These impacts, calculated in the millions of dollars for most agencies, are attributed to preparedness, personnel, equipment, planning, training, and public outreach.

### **Native American Concerns**

While many of the concerns of Native Americans are similar to others potentially affected by the Yucca Mountain Project, it is important to recognize that Native American concerns must be considered in ways that identify and reflect the range of impacts from a tribal perspective.

## **7.2 Recommendations**

The large number of unanswered questions, inadequacies, inaccuracies, and findings related to impacts call into question the appropriateness of Yucca Mountain as a suitable repository site. Therefore, the site should be disqualified in compliance with the NWPA. However, in light of the Secretary of Energy's intent to move forward with a positive site recommendation, Clark County recommends the DOE do the following:

- Complete an EIS process which ensures compliance with NEPA and other federal regulations, and which is based on a final repository design. This could include withdrawal

of the current DEIS and SDEIS, and a new EIS process which includes the preparation of an FEIS with full hearings prior to further action by the U. S. Secretary of Energy.

- Conduct a national transportation study and develop a plan to address concerns of all affected jurisdictions nationwide. This plan should ensure coordination of roles and responsibilities among government entities, and sufficiently address public safety issues such as radiation exposure and terrorism.
- Acknowledge the nature and extent of the impacts to all local, state, and tribal governments nationwide before making a final decision to approve a high level radioactive nuclear waste repository at Yucca Mountain.

## Acknowledgements

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## Appendices

Appendix A	Resolutions in Opposition to Yucca Mountain by Groups Other Than Clark County, Nevada
Appendix B	Clark County, Nevada's Resolutions in Opposition to Yucca Mountain
Appendix C	Clark County, Nevada's Comments to U.S. Department of Energy's Draft Environmental Impact Statement (DEIS), Formal Response to Supplemental Draft Environmental Impact Statement (SDEIS), and Formal Response to Preliminary Site Suitability Evaluation (PSSE)
Appendix D	University of Nevada, Las Vegas, The Center for Business and Economic Research Report (December 26, 2001): <i>Regional Economic Model, Inc. (REMI) Analysis Utilizing Urban Environmental Research, L.L.C. (UER) Property Losses to Determine Economic Impacts on Clark County's Scenarios</i>
Appendix E	Maps and Descriptions of Transportation Scenarios 1, 2 and 3
Appendix F	G. Roger Gathers, M. H. Chew & Associates Report (July 16, 2001 Revision A): <i>Calculations with RISKIND for Rail Transport of Spent Nuclear Fuel Casks Via Las Vegas, Nevada</i>
Appendix G	U.S. Department of Energy Deficiency/Corrective Action Reports
Appendix H	Public Involvement, Outreach and Comments
Appendix I	References



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